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THE COMMERCIAL CAR JOURNAL

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Seventy thousand Republic Trucks are traveling the streets and highways every day, everywhere, rendering satisfactory and uninterrupted service.

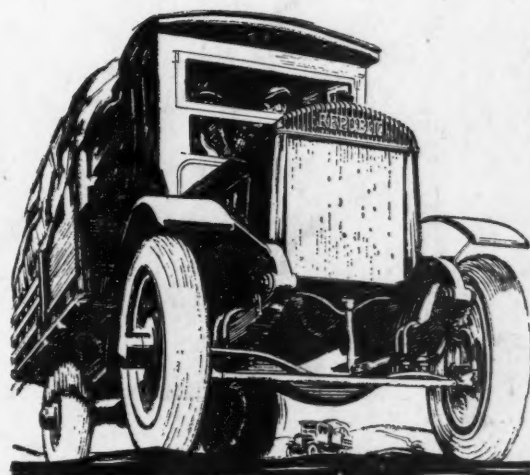
This number increases each week, and, by reason of these numbers, covers the country with a close net-work of continuous hauling.

Is it not reasonable to assume that, with wider experience and closer insight into haulage problems we are better able to serve the transportation needs of business in the cities, the towns and on the farms?

The Republic Truck is right and fit when it leaves the largest truck factory in the world, at Alma, Mich. It is kept right and fit by 2000 Republic Service Stations and seven National Parts Depots.

Capacities 1, 1½, 2½, 3½ Tons

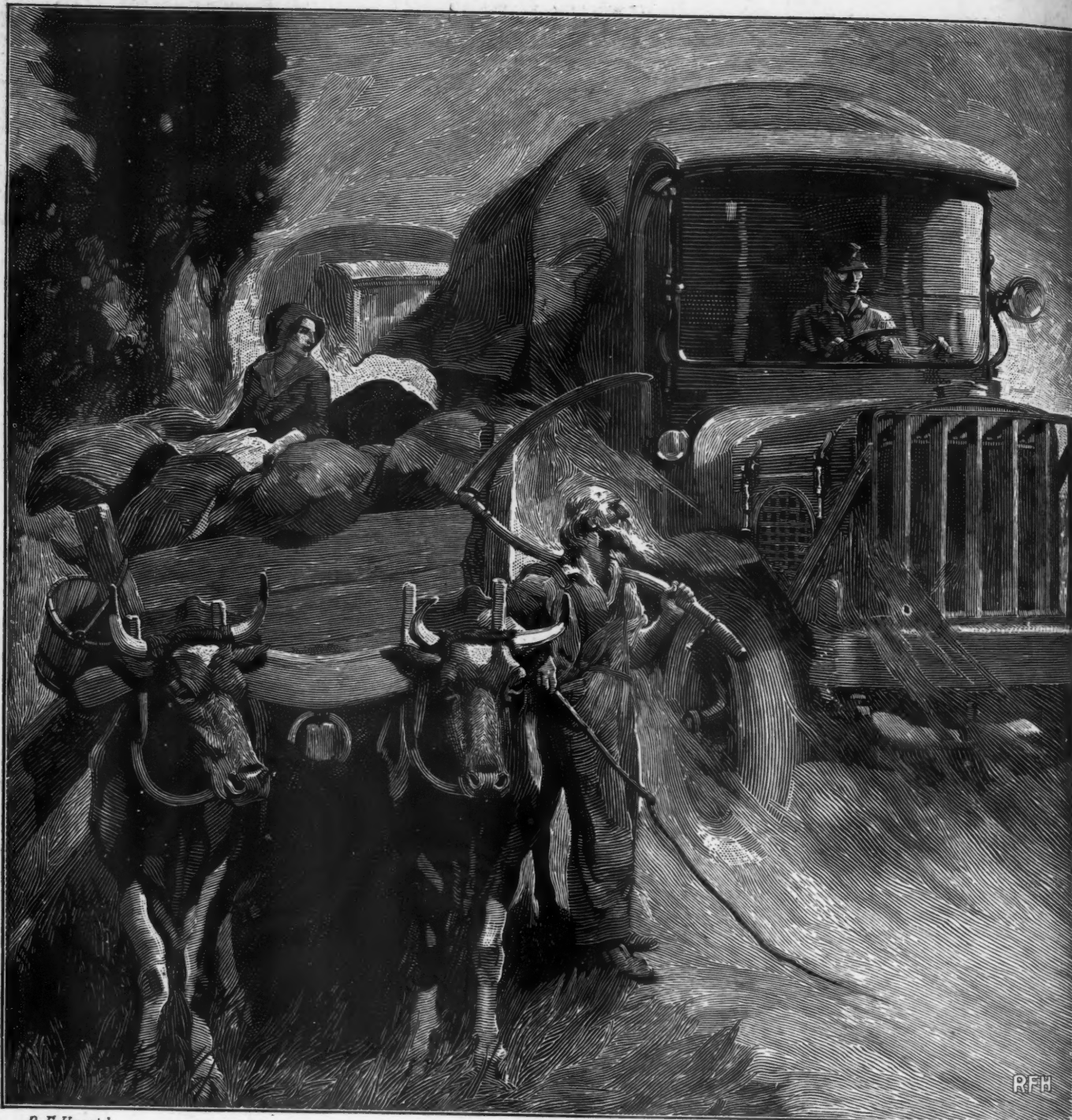
Republic Truck Sales Corporation
938 Michigan Ave. Alma, Michigan



REPUBLIC TRUCKS

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R. F. Hewrich.

© Clark Equipment Co. 1921

"THE SPIRIT OF TRANSPORTATION"

Max Bohm
Franklin Booth
George Elmer Browne
James Cady Ewell
R. F. Heinrich
Frank X. Leyendecker
Jonas Lie
St. Louis Mora
Alphonse Mucha
Maxfield Parrish
C. Coles Phillips
William Mark Young

Civilization has progressed only as methods and means of transportation have improved. Appreciating the contributions to transportation and world advancement made by the American Automotive Industry, we have invited these well known artists to dramatize, each in his own manner, "The Spirit of Transportation."

CLARK EQUIPMENT COMPANY
BUCHANAN MICHIGAN

MANUFACTURERS OF
CLARK AXLES AND CLARK STEEL WHEELS
FOR GOOD MOTOR TRUCKS

These paintings will be
on exhibit as follows

NEW YORK
Hotel Commodore
January 8th January 15th

CHICAGO
Congress Hotel and Annex
January 29th February 4th

BOSTON
Copley-Plaza Hotel
March 12th March 19th

He honors himself best as he
honors his industry most



THE PUBLISHERS' PERSONAL PAGE



Merry Christmas! Happy New Year!

Dealer Morale Essential to the Manufacturer's Success



It is becoming increasingly important for manufacturers to co-operate more than ever in order to assist their dealer organizations in weathering "business storms."

The studying of retailers' problems and the offering of constructive advice for merchandising are among the helps that the manufacturer can render his representatives; but, first and foremost, the maker should assure himself of the confidence of his dealer organization.

This cannot be done if the manufacturer fails to show courage and give proof of his belief in the future of the motor truck industry. Quite the reverse is the case when the manufacturer withdraws his trade paper advertising, for the dealer feels that the factory has lost heart or is unable to keep pace with the more progressive companies in the commercial car field.

It is at this point that the dealer's faith wavers in the product he handles and the factory he represents. It is reasonable to suppose that any assistance the factory might attempt to give the dealer would be received with less enthusiasm when confidence is destroyed.

This is one of the reasons why today, more than at any other time in the history of the motor truck business, dealers are changing agencies. It is also why, more than ever, the dealer is looking to his trade paper for help, is reading it carefully and scrutinizing every advertising page. He is seeking a message from those manufacturers who have courage and confidence and are willing to extend co-operation.

The dealer needs encouragement and the manufacturer must give it in order to gain the respect of dealer clientele. The momentous question at the present then is—"Have you the courage of your convictions?"

A New Design for a New Need

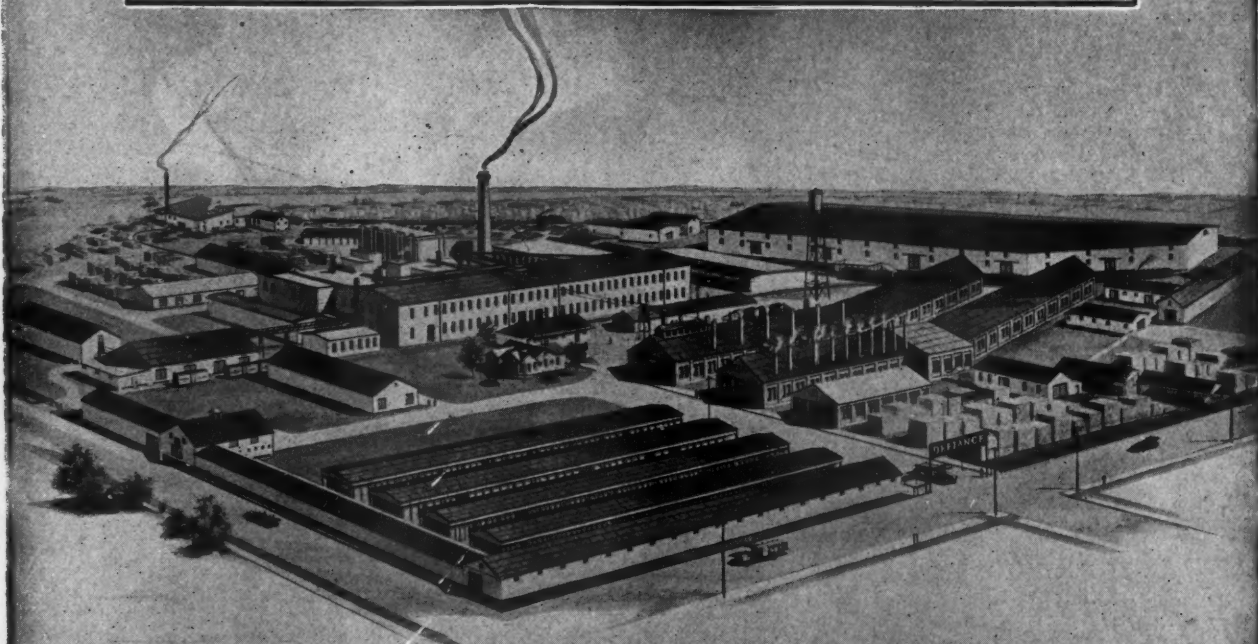
The demand for greater speed with safety cannot be met by merely putting pneumatics on any truck—and running the truck at a higher speed. The new need means new trucks, designed to fit the new conditions.

DEFIANCE *New Design* SPEED TRUCKS

Defiance distributors are prepared to meet this new demand; for the Defiance *New Design* Speed Trucks are designed and built to do a bigger day's work.

A Line to the Factory Will Bring Our Liberal Proposition

(8)



Manufactured by
DEFIANCE MOTOR TRUCK COMPANY
Defiance, Ohio.

THE COMMERCIAL CAR JOURNAL

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TABLE OF CONTENTS

	PAGE
Advertisers' Index	268
Buyers' Index of Reading and Advertising Pages.....	264
Commercial Car Specifications	67
Editorials	35
Equipment and Appliances	48
Metal and Rubber Markets	100
New Commercial Cars	41
News of the Trade, Including Personals, New Agencies, Factory Items, Etc.	26
Pneumatic Tire Prices	81
Replacement Table	67
Service and Repair Departments	55

SPECIAL ARTICLES

National Truck Sales Managers' Convention	13
How Can the Truck Sales Managers Build for the Future?	19
Truck Service Managers Have Their Innings at Cleveland Meeting	24
Original Features for New York Truck Show	29
New Idea for Increasing Efficiency of Automotive Trade Advertising	30
A. E. A. Show Presages Future Trade Activities.....	31
Facts Concerning the Conditions and Problems of the Bus Business of Today.....	34
Repairing the Giant Pneumatic Cord Truck Tire.....	84
Trailer Industry on the Pacific Coast	87
Selling Farm Electric Lighting Systems in the Garage and Dealers' Field	92
Activities of the Motor Truck Association of Philadelphia	94
A Sales Campaign That Sold Hundreds of Trucks to Farmers	95
Discussion of Truck Tank Designs	102

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"NORMA" PRECISION BALL BEARINGS

(PATENTED)

A dominant position in any field may be attained by salesmanship plus quality. But to maintain that position, quality must fight alone. For a decade past "NORMA" Bearings have been standard in the high-grade magnetos and lighting generators identified with cars, trucks, tractors and power boats of the better class. Their dominance has not been undisputed—but their unvarying quality has maintained it.

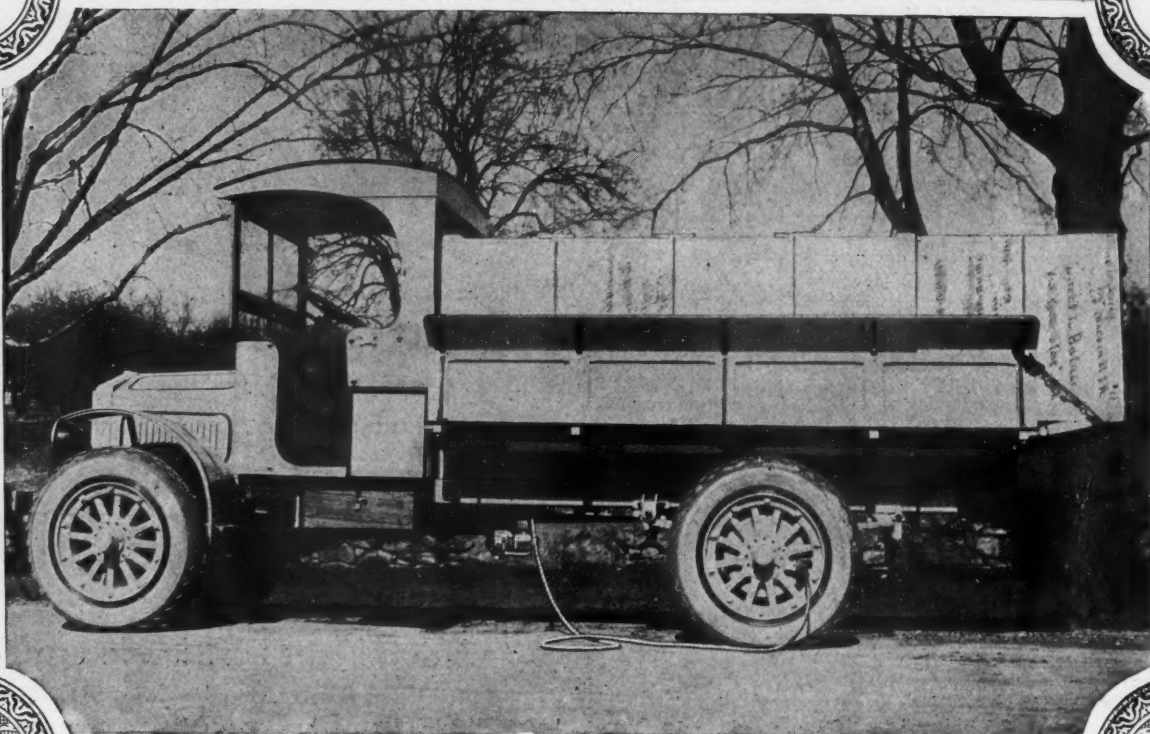
See That
Your Electrical Apparatus
is "NORMA" Equipped

THE NORMA COMPANY OF AMERICA

Anable Avenue
Long Island City
New York



Ball, Roller, Thrust and Combination Bearings



No Motor Truck or Motor Car is completely equipped that is not equipped with a Kellogg Engine-Driven Tire Pump

The Kellogg Pump Is a Vital Part of a Truck or Car

THE KELLOGG Engine-Driven TIRE PUMP is as essential a part of a motor truck or car as a horn, lights, or a brake.

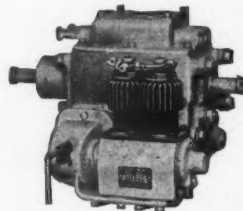
Efficiency in the transportation of merchandise and pleasure in motoring are dependent upon tire conditions.

Tires of any size can be inflated quickly with a KELLOGG power pump. An interrupted trip can be completed with little delay. And tires that are properly inflated are not so liable to puncture or rim-cut.

Without KELLOGG Engine-Driven TIRE PUMPS it would not be possible to operate motor trucks equipped with pneumatic tires.

Practically all of the leading motor trucks and cars manufactured today are equipped with KELLOGG Engine-Driven TIRE PUMPS as standard equipment.

CAUTION
Make sure your Motor Truck or Motor Car is equipped with a KELLOGG Engine-Driven TIRE PUMP



KELLOGG MANUFACTURING CO., ROCHESTER, N. Y., U. S. A.

KELLOGG

TIRE PUMPS

THE SATURDAY EVENING POST
October 30, 1920

Molybdenum Steel

The American Super-Steel
and
YOUR TIRE BILLS

TIRE expense is the largest single upkeep item in connection with a motor car. The public is, for this reason, turning to the light-weight car because of its tire economy.

As you know, a motor car is a product of steel. No car can be better than its steel.

The use of Molybdenum Steel results in extra strength plus a very substantial reduction in weight. This means greater economy of operation.

Your tires will go many more miles if your car is built of Molybdenum Steel.

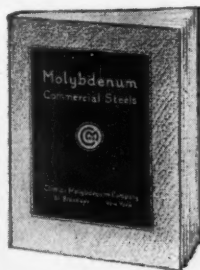
They will last longer because this steel permits engineers to design and construct lighter, stronger, more economical and more perfectly balanced motor cars and motor trucks.

We sure your car or truck is made of Molybdenum Steel.

The United States is dependent upon importations from foreign countries for all steel alloying elements except Molybdenum. The world's chief source of this metal is at Climax, Colorado.

Climax Molybdenum Co. associated with The American Metal Co., Ltd.
61 Broadway, New York
Climax Molybdenum Company is the largest producer of Molybdenum in the World.

The Answer To a Universal Demand



The new efficiency of Molybdenum Steels, in both production and service, is treated fully and authoritatively in our book, "Molybdenum Commercial Steels." Copies will be sent on request.

With the minds of motor car and truck owners everywhere centered on lower operating costs, the Climax national advertising campaign on Molybdenum Steels is spreading a message of unusual timeliness.

Its keynote is reduced upkeep through lighter weight, without sacrifice of strength or durability—a policy brought within easy reach of automotive manufacturers by Molybdenum Steels.

The United States is dependent upon importations from foreign countries for all steel alloying elements except Molybdenum. The world's chief source of this metal is at Climax, Colorado.



Climax Molybdenum Co. Associated with The American Metal Co., Ltd.
61 Broadway, New York

Climax Molybdenum Company Is the Largest Producer of Molybdenum in the World

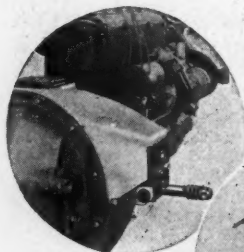
The Flexible SELDEN TRUCKS *of Today*



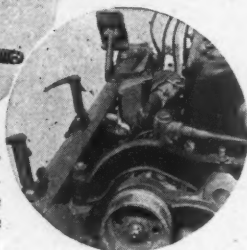
Visit the
Highway Transportation Show
January 3d to 8th, inclusive
Twelfth Regiment Armory
62d St. and Columbus Ave.
New York City
Selden Space
Section "C," 29 to 32



FLEXIBILITY, in practically any form of construction, provides increased resistance and therefore greater strength. A wire coiled into a spring will sustain a shock that would break it if it were stretched taut. The spring converts the sudden shock of great intensity and short duration into a slight pressure of mild impact and long duration.



Showing the front support of the 3-point motor suspension which provides full flexibility.



Showing the rear supports which permit the motor to move with the sway of the frame.

Trucks of rigid construction cannot withstand for long, without sustaining serious injury, the shocks and twists and strains which they are subjected to when traveling over uneven road surfaces.

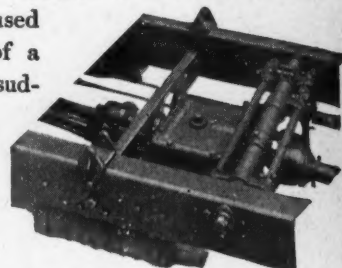
The flexible construction of SELDEN TRUCKS

functions the same as a spring—it so protects the vital parts of the trucks from sudden blows that their lives are greatly extended and maximum protection is afforded to the loads carried. The FLEXIBLE SELDEN FRAME may be twisted to a considerable extent without racking or sagging. The side members are braced with diagonal steel straps which prevent

horizontal distortion; and the cross members are so joined with the side sills that they may twist slightly under a vertical load.

The SELDEN MOTOR is mounted flexibly on three points and on spring sub-frames, which provide greater freedom of movement and permit the motor to move with frame sway without strain. The method of suspension of the radiator, too, is such as to provide it with abundant protection.

Not a rivet is used in the construction of the flexible Selden models. S. A. E. bolts are used throughout; all joints are of a flexible type that prevents sudden warpage from inflicting serious damage; and well placed spiral springs offer still further protection. All the less accessible joints are fitted with graphite-impregnated, self-lubricating, bronze bushings.



Showing flexible mounting of amid-ship transmission, cross members and supports.

Selden FLEXIBLE construction marks a distinct advancement in motor truck construction.

DEALERS find flexible SELDEN TRUCKS a profitable line to carry. Profits on their sale are greater because there are fewer calls for "free service."

1½, 2½, 3½, 5 Ton Models—All WORM Drive

SELDEN TRUCK CORPORATION, Rochester, N. Y., U. S. A.

Selden Motor Trucks



PERFORMANCE

American Hammered Piston Rings are made to give service. Each month over one and three-quarters of a million concentric individual castings are machined and hammered into *leakless* piston rings.

Demand is for a leakless piston ring.

Ask Your Jobber

AMERICAN HAMMERED PISTON RING CO.
BALTIMORE, MARYLAND

The Lavine **Steering Gear**

The Adjustable Gear

It has taken ten years of unremitting experimentation and toil to bring the Lavine to its present highly perfected state.

The Lavine is the **SAFE** Gear. So certified to by the Nation's foremost truck makers who will accept no substitute.

A simple and rugged construction; a thoroughly hardened mechanism; a positive **ADJUSTMENT**—these notable features are found only in the Lavine.

*Why not put your gear problems up to the leading gear specialists in the automotive industry? **WRITE.***



LAVINE GEAR CO. MILWAUKEE WISCONSIN



LOCKED

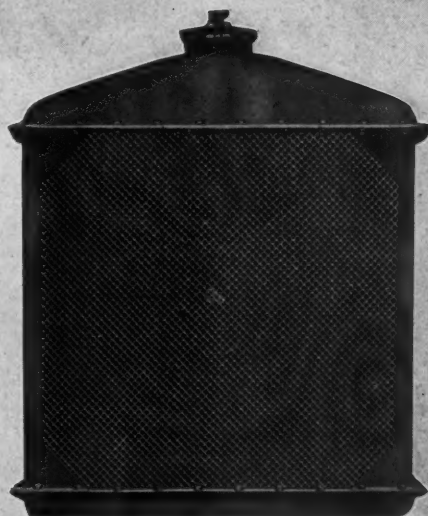
ORDINARY radiators depend on solder alone, and leakage follows. Every tube in a G & O Radiator is closed at the ends with a positive lock seam before soldering.

G&O

Radiators

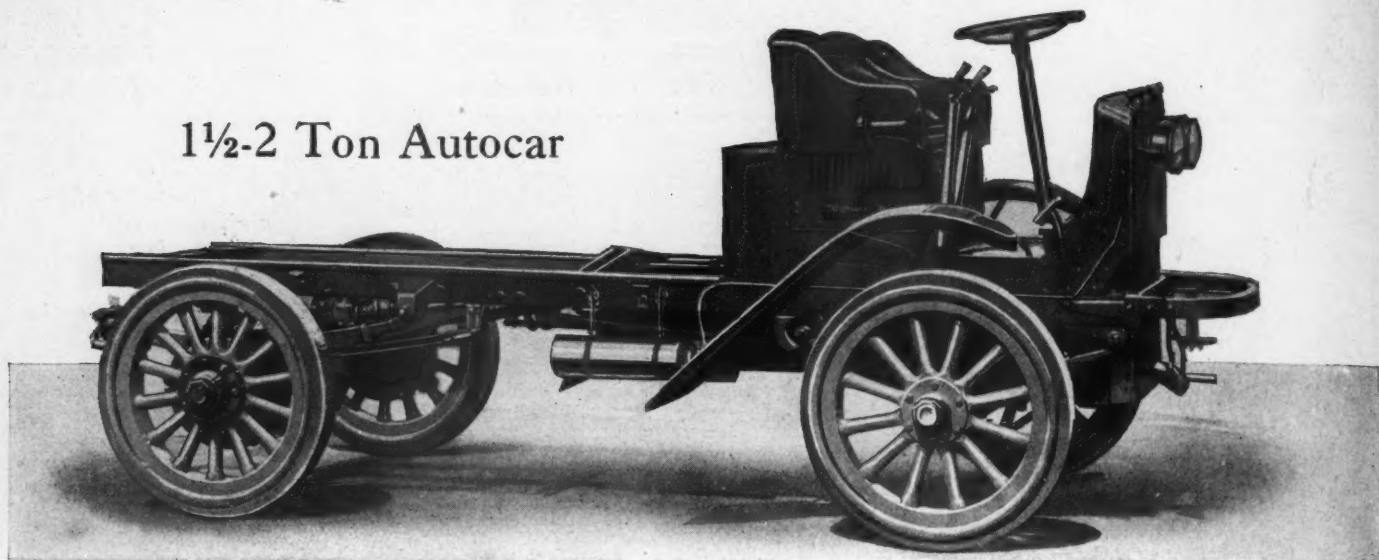
Forty-four manufacturers who value service-giving refinement in construction, cool their engines with G & O Radiators.

THE G & O MANUFACTURING CO.
New Haven Conn.



1921 Models and Prices

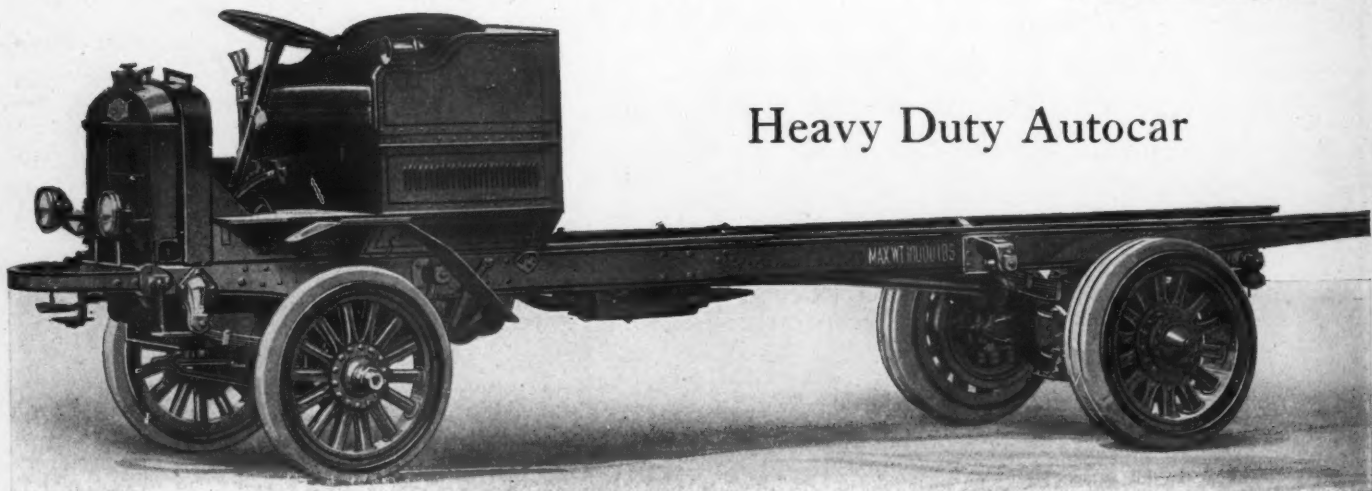
1½-2 Ton Autocar



Type XXI-F, 97 inch Wheelbase \$2300

Type XXI-G, 120 inch Wheelbase \$2400

F. O. B. Factory, Ardmore



Heavy Duty Autocar

Type XXVI-Y, 120 inch Wheelbase \$4350

Type XXVI-B, 156 inch Wheelbase \$4500

F. O. B. Factory, Ardmore

THE AUTOCAR COMPANY, Ardmore, Pa., Established 1897

The Autocar Sales and Service Company

New York
Brooklyn
Bronx
Newark
Schenectady
Syracuse

Boston
Providence
Worcester
New Haven
Springfield
Hartford

Philadelphia
Camden
Allentown
Wilmington
Atlantic City

Pittsburgh
Baltimore
Washington
Richmond
Atlanta

Chicago
St. Louis
Dallas
Los Angeles
San Diego

San Francisco
Sacramento
Oakland
Stockton
Fresno
San Jose

Represented by these Factory Branches, with Dealers in other cities

Autocar

Wherever there's a road

The Commercial Car Journal

VOLUME XX

PHILADELPHIA, DECEMBER 15, 1920

NUMBER 4

Better Selling Methods and Closer Co-operation Between Sales and Production Departments Urged at Truck Sales Managers' Convention

**Closer Co-operation With Dealer is Necessary. Agricultural Field Still
Unsold and Offers One of the Greatest Outlets for Sale of Motor Trucks**

NOT since its inception has the National Association of Motor Truck Sales Managers held a more interesting or highly educational meeting, than the one held last month in Detroit, November 18 and 19. The meeting was given over to heart-to-heart speeches by prominent men both in and out of the industry. It was gratifying to note that many of the subjects which were taken up by the speakers at this meeting were along the same lines as those discussed in past issues of this publication, namely, subjects dealing with better selling methods and closer co-operation among the trade.

The sessions, which were held in the afternoon and evening, were well attended. The close attention paid by the members to the message that each speaker delivered showed that the truck sales managers realize that different methods must be pursued in the future, and that the

motor truck distribution and salesmanship must be placed upon a higher plane.

Election of Officers for 1921

The first morning was given over to a business session, at which officers for the ensuing year were elected. H. T. Boulden, of the Selden Truck Corp., was elected president, succeeding J. E. Tracey; E. T. Herbig, of the Service Motor Truck Co., vice-president; A. E. Schafer, of the Gramm-Bernstein Motor Truck Co., secretary and treasurer; H. D. Dabney, executive secretary.

Directors elected for one-year term: A. C. Burch, vice-president of the Clydesdale Motor Truck Co.; W. K. Ackerman, vice-president Lewis-Hall Motors Corp., and E. D. Hand, sales manager J. C. Wilson Co.

Directors elected for two-year term: A. E. Schafer, sales manager Gramm-Bernstein Motor Truck Co.; E. T. Her-

big, sales manager Service Motor Truck Co., and Homer Hilton, sales manager Oshkosh Motor Truck Mfg. Co.

Directors elected for three-year term: J. E. Tracey, sales manager Sterling Motor Truck Co.; W. A. Clare, sales manager Atterbury Motor Truck Co., and H. T. Boulden, vice-president and sales manager Selden Truck Corp.

To Co-operate With Dealers' Associations

At this session the work of the association for the coming year was freely discussed, and it was felt that all of the work was to be accomplished by the ultimate education of all of the elements involved in the motor truck industry. The motor truck sales managers feel that the best manner in which they can further the educational work of the association would be by sending emissaries of their organization into the retail field to meet with local dealers, salesmen and users. It



Over Two Hundred Members and Guests Attended the Sales Managers' Banquet

was felt that there was the need for hearty co-operation between the distributor and dealer and the factories, and that any efforts directed along these lines would bring about a better understanding.

After a lengthy discussion of the plan a resolution was passed as follows:

"That a Committee of three of the members of the association be appointed by the Chair to constitute a committee of four, of which the chairman shall be the Executive Secretary, which committee shall collect and distribute information; find speakers to appear at the meetings of the various organizations of any part of this industry, to direct the material to be used by the speakers in these meetings and to form a library of information, from which information required may be drawn at will for the use of such speakers."

It was felt that by sending out members of the salesmen's organizations to other organizations it would give the retail trade an opportunity to know what the problems are of the factory, and that it would bring the work of the association closer to the attention of the retailers. The speakers would have at their disposal information showing in direct dollars and cents value the effect bad trade-ins or bad financing, lack of capital or various other evils have upon the dealer, and to sell the dealers in that town against such things, and to get them together in honest competition. It was the opinion of the meeting that this plan would help the dealers, as they would recognize a member of the Sales Managers' Association coming from the outside when they would not recognize a leading member of their own trade from their own city.

Conducive to Larger Membership

At this session an amendment to the by-laws of the association was passed to eliminate the words, "And which company has also manufactured and sold not less than two hundred (200) motor trucks within the twelve months last past." The amended by-laws now read as follows:

"Article 1, Section 3 (A). The Sales Manager or Sales Director of any Corporation, firm or individual, as above limited, which company shall be of recognized financial responsibility and marketing a product conforming to recognized standards of engineering and quality, may become a member of the Association upon being proposed by two members of the Association, by being favorably reported upon by the committee on membership and then being elected by a majority of the members of the Association present and voting at the time of proposal."

The afternoon session was opened by Mr. Tracy, who introduced the new president, Mr. Boulden, who then presided, and in a short speech of acceptance outlined briefly the future plans of the association. The speakers of the afternoon session of the first day were Harry Mook, manager of the N. A. D. A., and E. T. Howson, western editor, Railway Age, Chicago.

Mook called particular attention to the functions of the dealer organization which he represents, and the necessity for closer co-operation among all branches of the industry. He emphasized

his talk with charts which helped to drive home the things that the sense of hearing loses. Mook laid particular emphasis on the necessity for the legal department in connection with an association. In this connection he stated that the legal department of the N. A. D. A. has saved the industry a whole lot of money because "98 per cent of the questions that reach our office and our legal department pertain to the motor truck. They seem to be involved in a great many more legal complications."

According to calculations made by his association, "it is found that the average life of a retailer is seven and one-tenth years and that 93 per cent of all retailers fail."

On one of Mook's charts the question asked was, "What would happen if all the automobile traffic were stopped for ten days? In speaking of this, Mook said:

"This question was telegraphed my office by Mr. Reeves, of the N. A. C. C. I personally went down to the city of St. Louis to the financial district and picked out a man to answer it, Mr. John Lonsdale, a railroad builder, a business man and a banker connected with a \$100,000,000 bank. When I popped the question at him, he said, 'My God, don't shoot anything at me that fast.' I said, 'But what,' offhand, 'do you think would happen, Mr. Lonsdale?' He said, 'Give me a chance to think it over.' He went on to say, 'We have enough of grief in this country; don't even think of such a thing.'"

"It has been suggested to certain people who have been making a football of the industry, to do this thing and see what would happen. You know, I for one, in my own personal consciousness, don't believe it is the privilege or the right of any man in any line of business to get out on a platform and tear down another industry."

"Understand, I don't hold any brief for the shyster in this industry any more than you do for that man in the manufacturing end. The man who can't present a bankable statement, the man who doesn't understand what he is doing, has no right to banking accommodations, but that does not give the privilege to men to go out and try to dynamite the business such as has been done by members of the banking fraternity."

Must Keep Eagle Eye on Legislation

The need for organization was again brought up by one of Mook's charts, which contained the question, "Oh, why do they pick on us?" As Mook says, because "we lack organization. They don't pick on insurance men any more, or any of the public utilities, or any of the larger industries throughout the country. They have gone through the battle."

"For seventeen years the piano men have been organizing and when the world was crying for wire, steel and cypress, the piano men were getting it to manufacture pianos and musical instruments."

"The telegraphers' union, just a body of wage earners, have \$1,200,000 in their treasury. Their Washington representative receives \$50,000 a year."

In reference to legislation, he stated:

"The matter of legislation in these various states is going to be of great con-

cern to you gentlemen who are in the motor truck business and the sad part of it is (and it is a thing I do not like to talk about, because I like to talk about things that are helpful and optimistic) of the people in our organization who are paying the small sum of ten dollars apiece for membership, there are less than 100 who are engaged in the exclusive business of selling motor trucks. That, in view of the fact that most of the work has been among motor truck men, is rather a startling thing. I don't know how it can be remedied, but I know there should be some means evolved so that every man who sells a motor truck, if it can be done, should be a member of the Association for his own benefit.

"It is a sad state of affairs when we stop to think that there will be 5,000 bills proposed in the 42 legislatures that will meet beginning with January. Five thousand! That is a tremendous lot of legislation, and there isn't a man that is elected to that office that is going to the halls to make laws that hasn't stuck away somewhere about his person a bill whereby he is going to rule 'these here heavy trucks off the roads.' Now, we have just recently put in an automobile man in the State of Missouri. We did that in passing, but I think it wouldn't be a bad idea if we put a little more interest in this thing. We can sit back and throw rocks, but we don't work with them. You can't expect the lumber man and the druggist who go to our halls of legislature to legislate in your favor; they have their own axes to grind."

Why Not the Automotive Industry?

"The industry of mining has seven men in both houses in Colorado. You can't think of proposing anything regarding mining there but what you are up against men who know about it. In the automobile industry, we have never given it any thought."

"It is all very well to say that the automobile dealer living in the community will look after it. He is a human being the same as you and I and he has the same selfish inheritance—look out for myself first."

"A few weeks ago a man in Missouri wrote in and said: 'How about the gasoline tax?' We said that there was no such thing on the statute books of Missouri and he wrote back, 'The hell there isn't! It just cost me \$52.85 to find there was.' We wrote to find out what it was and found out it was a pump tax, and that for every gallon of gasoline a month over 250 gallons a man sold, he would be charged an eighth of a cent tax. We found it was paraphrased on to another bill that had nothing to do with taxation, but there it was, a law."

"Some time ago there was a stagnated market as far as the motor truck was concerned. They weren't moving as they should. The thought occurred to us, 'Why not take this motor truck off the floor and take it out and show it to the world?' We went to work on these plans, and we carried this merchandise we were trying to sell out into the country and showed the farmers and business men that the motor vehicle could travel on schedule time, that it could go into all kinds of highways and byways and perform the things."

we were talking about, with the result that in one little town, in Rushville, the dealer there had bought one truck in nine months in the period previous, but bought nine two weeks after the tour. Since then we have sent out thousands of pieces of literature on truck tours. I believe it is a wonderful help to take these automobile trucks off the floor, taking off these white ribbons that decorate the radiators, and put them to work and show the prospective purchaser they can do the work. Truck tours create demand.

"Travel from this earth to the stars and back, it is always the same; two and two make four. That same principle is true in the matter of merchandising. There are always these four elements—merchandising, departmentizing, specializing and economizing. They are the cardinal prin-

ciples, as I am quite pleased to regard it.

"I tell you I think our folks are asleep on the job. I will tell that to manufacturers and I will tell that to dealers, because I believe it to be true.

"There are thousands of men engaged in the business of manufacturing motor vehicles **that are doing a bigger business today than they have ever done.** They are actually showing increases, but they are not doing it by wishing for it; they are going out **and they are going to work.** Golf games have been canceled and everything else, and they are down on the job. That is going to be mighty necessary form now on, and the man who doesn't, will be around among the insolvents.

"We are engaged in the business of selling transportation, not selling motor vehicles. It is transportation that we are

selling, and we lack this merchandising. That is the necessity. That has been the success, if you please, of men who do not belong to the ninety-three per cent, but who belong to the seven per cent that have made a success, and what is it? Merchandising! Selling! Selling!

I believe that—that from now on—is going to be the business of the world, not merely going and talking to a man, but selling him. Of course, they don't want to buy automotive merchandise now. Hell! The sales manager knows that before he sends out the man. If he knew they wanted to buy, he would not send out salesmen, he would send out messengers. I would fire a man who came back and told me that the fellow he went to see didn't want to buy now. I know that before he starts out. What we want is men



Hal T. Boulden
President



S. T. Herbig
Vice-President



A. E. Schafer
Secretary-Treasurer



H. D. Dabney
Executive-Secretary



J. E. Tracy
Director

Officers and Directors
of the
National Association
of
Motor Truck Sales
Managers



E. D. Hand
Director



A. C. Burch
Director



W. K. Ackerman
Director



Homer Hilton
Director



W. A. Clare
Director

that will go out and change the other fellow's mind.

"I have a friend who is in the life insurance business. I said to him the other day, 'Art, how is business? Many coming into the office for life insurance?'"

"He said, 'No. They never did. I am getting all the business I can take care of, but I am working for it.'"

"The Burroughs Adding Machine man doesn't sell you levers and wheel base and transmission; he sells you on the necessity of taking care of a problem you have. And, what does he do after he makes the investigation? He hands you a type-written report for a \$960 sale!"

"You know what the average retail man does? He struts into a man's office and says, 'I am a motor truck salesman.' They will have to begin to prove it, gentlemen, because they will get mighty hungry before the winter is over."

"We have spoiled a great many people by using the word 'free' to it. Why should it be? You don't find the Burroughs Adding Machine or any other company doing it on mechanical devices. You look at their contract, and you find they put the service contract in the back—it costs so much a year for service on this machine."

"There is going to be more merchandising from the rear door from now on than from the front door. I have said that a good many times in the past two years."

Proposes Motor Vehicle Chautauqua

"A thought occurred to me the other night and I think it would be a splendid thing and make us take the jump on any other industry twenty-five years, if we will start with all interested (by that I mean the National Associations) a Motor Vehicle Chautauqua. Now, you can print reams, you can write volumes of books, and you can't force a man to read. They won't read letters; they won't read bulletins; but they will come to meetings and listen if there is something of interest to be taken up."

"My thought was we would get a battle squadron of specialists, men who understand merchandising, accounting, banking and other things of that sort, so that we can show this man some of the fundamentals of ordinary business financing, organization, highways, and go into these centers and for one week ask our folks to come in and go to school. That isn't asking too much, is it, to ask them to learn more about their business?"

"It is a practical thing and I think it can be worked out, and if you men are willing, as an Association, to tackle a thing of that kind, the National Automobile Dealers' Association stands ready to do its part and put it over."

The next speaker of the afternoon was Mr. Howson, who urged co-operation between the motor truck and railroad interests and that the railroad should not be looked upon as a competitor, but rather as an ally and that each will provide facilities within that sphere in which it is best fitted to serve. Howson said: "The public, whom both industries serve, must be the judge and that mode of transportation will survive which best meets its needs, service and cost considered. It think that railway which strives to handle intercity

tram car or short haul package freight traffic, at a loss to itself, is equally in error with the motor truck manufacturer who encourages his patrons to seek long haul traffic, for each is creating an economic loss. Rather, I think that the next few years will see the gradual segregation of traffic between the three principal transportation agencies, the motor truck, the electric railway and the steam railroad. One student of this subject has come to the conclusion that in general, the motor truck is best adapted to handling high-class traffic, moving in small quantities up to distances of twenty to twenty-five miles, the electric railway for distances ranging from twenty-five miles to perhaps sixty miles and the steam railway for longer hauls. Local conditions, of course, create a broad twilight zone between these fields, although they are perhaps fairly accurate as a general guide. When the time comes that these distinctions are mutually recognized, these agencies will be truly complementary to each other rather than competitive."

Mr. Howson also emphasized the necessity of studying users' problems, taking to him an analysis of his needs and the ability of the dealer to serve. In this connection, he said: "I know of no field where that is more important than with the railway men. The railway man, the same as any other, is involved in his own problems. He wants to know how it will do the work. He will leave the mechanical details to somebody else. But if you will convince him that your truck will do a certain work better than some other method, that is the thing he wants. I think it requires some study of his situation in order to sell him on that idea, but if you can go to him with the idea that you have, rather than sell him on generalities, he will give you all the time you want to demonstrate your case."

Should Synchronize Sales and Manufacturing Department

The evening session was given over to a banquet, which was attended by over 200 members of the association and guests. Secretary of Agriculture B. T. Meredith and W. R. Wilson, vice-president of the Irving National Bank of New York, were the principal speakers.

Secretary Meredith asked the members to take a greater interest in the work that the agricultural department is doing and that they should study the work done by the agricultural colleges and 2,000 county farm agents in this country. He cited some interesting work which the department has done in eradicating disease and epidemics among cattle and farm products.

W. R. Wilson gave the members a great deal of vital information and laid particular attention to the necessity for synchronizing sales and manufacturing.

"It is regrettable," stated Mr. Wilson, "that in so many companies efforts along these lines are not as closely co-ordinated as they should be. In flood times, such as succeeded the Armistice, orders were sometimes taken far in excess of production capacity, and criticism would then grow in the sales department that the production end was inflexible, and even possibly inimical. In times like these the manufacturing department gets its

innings and reflects upon the ability of the sales end to handle distribution. Unless the two stick close together, how can they adequately meet either the flood tide or ebb tide in business? How often one hears from one side that a well-made product sells itself, implying little need of a sales division. But grant that a well-made product does not distribute itself, nor does it sell the institution."

Should Have More Balanced Inventories

"Another result of synchronizing your manufacturing and sales should be reflected in a reduction of your inventory to meet these times, and also in a new determination to take the proper means to insure hereafter more balanced inventories. In a great business like yours, where even a one-model production involves several thousand parts, and where you buy some finished and manufacture others, and where you purchase some even as assemblies, inventory control presents a very real problem. The production and sales managers should face together the fact that inventory control involves a production control system, a purchase control, and the control extending through the follow-up department, traffic department and stores department. This whole train of control implies a very close relation with the sales division so that actual sales conditions as a basis for the flow of materials and output shall not be concealed from those directing production. I do not imply that production should fluctuate exactly with sales because that would knock out your costs and also your financial calculations."

"It is becoming more and more the recognized idea that as near a uniform production as possible means closer and lower costs, better control of quality, easier accounting, least embarrassment to the treasurer, and the proper consideration of our labor whose alternate hiring and release is demoralizing. It is to contribute to this ideal that a means of financing the dealers' winter carry of cars is so important. Your industry has always been more fortunate than the passenger car business where, for years, we had seasonal changes in styles and models, but even production is an ideal to be approached. Meanwhile, only the closer relations between sales and manufacturing can the best conditions be worked out. In other words, sales and production managers should go into much closer partnership in the future than in the past. Friendly rivalry is good, but co-ordinated effort is better."

"Meanwhile, your advertising policy also should be brought up before the bar. It should be challenged as to how well it reflects the fundamental excellence of your product, how adequately it covers the particular market you are seeking, and then whether or not, in the media employed, you are working directly on your prospective customer as with a rifle, or trying to find him by the use of a shot gun or blunderbuss. The need for a closer study of the advertising of your dealers is obviously an important part of this review. It is assumed, of course, that no one is so narrow as to stop advertising merely as a part of conservatism in a receding market."

JUST A MINUTE
MR SECRETARY

MR SECRETARY

MR DABNEY

BUSINESS MEN
WANT TRUTH
LITTLE THEORY
BUT ACTION

I SAY!
MR. DABNEY

MR SECRETARY

BRING UP A
COUPLE BOTTLES
OF GINGER ALE
AND SOME
CRACKED ICE

HE WILL HAVE SOME
JOB KEEPING THEM
IN THE MIDDLE OF
THE CHANNEL

OVER
PRODUCTION
OVER STOCKING
THE DEALER

BETTER
SALES
METHODS

DEFERRED PAYMENTS

PESSIMISM

ACCORDING TO SOME
SYSTEMS OF FIGURING
A SALESMAN IS WORTH
ABOUT 30 CENTS

6 HH
401417-
11407
1171584
44517757
30¢

A.E. SCHAEFFER
NEW SEC.-TREAS.

Bill

"The collective asset of publicity you have undoubtedly had prominently before you recently because of the obvious need to conduct a campaign of education throughout the country, among business men and bankers generally, as to the place truck transportation is taking, and entitled to take in the work of the world. That it is an essential in your mind, has gone without saying, but this demonstration of its primary importance in assisting the farmer, in aiding the manufacturer, in handling the distribution of food and fuel, in operation of our public service, in speeding the transfer of goods at our ports, in assisting railroads, steam and electric generally, must be brought vividly home to our bankers and business men. **A review of the new accomplishments of motor trucks during our war period alone could make for immense enlightenment. A concerted effort on the part of all truck manufacturers to develop a program of this kind, and the complexion it should take in the advertising of each individual company, is very important.**

Uniform Accounting System Needed

"From the sales manager's standpoint, one of the most important improvements to be made in distribution is the spread of a uniform accounting system, with uniform statements among all your distributors and dealers. **It can well be a part of your dealer co-operation in the future to sell a simple plan of this kind that will result in a real statement of conditions in their businesses each month with copies to your main office, not as a matter of surveillance, but as a means of going into their problems with them.** This will educate your selling organization and will improve the dealer, or disclose that he is not worthy of your line. **It will gradually bring new confidences from his banker.** The automobile industry, you will agree, has developed far more rapidly than it could supply mechanics on one hand, and this has led to the remarkable work in automatic machines, jigs and fixtures almost human, and progressive layout of machine departments and operations. On the other hand, it has expended more rapidly than it could develop dealers. **Toward this side of the problem it must therefore direct conservative thought and action from now on.** Here it encounters no mechanics but the need for men with sales and executive abilities, and the endowments of all-around business men, because they are each units of business that must stand on their own feet and their several communities.

"Time payment sales have developed in a remarkable way, and especially among motor truck companies. Because the product you sell is used in the production of wealth, time payment plans have permitted a much lower first deposit in the purchase of a commercial car than in the case of a passenger car, and in the same way a much longer term for serial payments thereafter. This only emphasizes, from a financial standpoint, the hazards involved in time payment sales in any business. It is a difficult time in which to get new or larger lines of accommodations, for the discount of time payment paper at your banks or elsewhere.

"**A campaign of education on truck transportation as an essential, will help your whole business a great deal in the future. But, on the other hand, time payment sales should always be regarded by both the sales manager and the treasurer with a great deal of scrutiny, both as to the individual cases and as to the proportions they bear to the total sales of your companies.** There are undoubtedly prospective customers entitled by every standard of good credit judgment, to make their purchase on a time payment basis. But wherever these purchases are permitted against good credit judgment, you are opening the door for an abuse which will reflect not only on your dealer, but yourself, and eventually upon your whole industry. I have no doubt but that in some instances local bankers, in different parts of the country, have a very legitimate reason for not wishing to supply automobile dealers, in stringent times like these, better than they do, because they have not been led to sufficient confidence in their ability as credit men and business men.

Mr. Dealer: If you have failed to thoroughly read pages 13 to 23 of this issue you have missed some valuable information.

and forced sales under time payment plans is one of the surest ways to permanently harm the building of this confidence."

Friday Morning Session

The morning session was opened with an address by C. C. Parlin, of the Curtis Publishing Company. Mr. Parlin, who spoke on "Potential Markets," used charts to help convey his message, these charts showing the past and present conditions in many industrial lines.

He called attention to the fact, that in the survey made among motor truck dealers that the reduction in the price of trucks would not do anything to very materially stimulate the market. He pointed out the buying power of the agricultural field and the necessity for studying the farmer's problems. He believes that quality is one of the first essentials in truck building and that more attention must be given to the proper kind of service and that the third requisite of a truck company is to have a vigorous selling policy. In this connection, he said: "That we are more and more getting to the point where we have to solve the dealer situation and I believe it cannot be solved as we did in the past two years. In the past two years, anybody with a truck could make a sale. Anybody could get a truck. Anybody could lay down arbitrary terms and get dealers. I think those companies are going to be successful that have a successful dealer policy, one to encourage the man to make the real investments he must to make a success. To sell a truck, a dealer has to have an investment; he has to be able to give service; he has to make a study of their proposition and sell it right. It seems this period we are going

into in selling will be the crux of the proposition."

The Outlook of the Future

The afternoon session was opened with an address by C. A. Musselman, general manager of the Chilton Company, and the subject of his address was "How Can the Motor Truck Sales Managers Build for the Future?" Extracts of this address, together with reproductions of some of the charts used to illustrate Mr. Musselman's address, are reproduced on the following pages.

Following this address, Mr. Hooker and Mr. Livingston, of the Burroughs Adding Machine Company, gave an interesting expose of the method used by the Burroughs Adding Machine Co. in selling its various products. This company sells its products to their dealers, whom they call "agency managers." These agency managers finance their own agencies and hire and train their own salesmen. The agency managers do not buy the product from the Burroughs Adding Machine Co.; they have it consigned to them.

One of the features of this address, which impressed the sales managers, was the thoroughness in which the Burroughs Adding Machine Co. goes into the matter of measuring its territory. This company disrespects state lines and figures it down to practically a machine as to what a man can handle and what the certain agencies can handle. They base their quota and the certain number of machines to be sold in a certain territory by the number of machines sold in the past. Past performance of the territory gives them the factor by which they measure the territory for the next year. Therefore, where business has been good, they expect it to be good. This company figures man power very carefully. They have it all figured out as to the number of calls a man can make a day, and they insist that a certain number of men be placed in a territory so as to enable the agency to conduct a profitable business. The men were given consideration according to the merit they displayed in handling their territory and their finances.

On the subject of "trade-ins," Mr. Hooker remarked "that this concern has a subsidiary company and these machines are their property. If the overhaul job is not too expensive, it is done at the agency. Everything sold is on an established price basis and no cutting is done on that price.

In conclusion, it might be stated that this address brought home to the sales managers one fact and that is, more attention must be paid to the allocation of territory and that dealers must be given more attention and checked up more carefully in their sales work. In other words, the days of handing the dealer a few states as his allotment of the territory are past. The manufacturer who wishes to do the right thing for his dealers must see to it that only enough territory is allotted so that the same can be covered intelligently. The idea of handing out more territory than the dealer in question can work advantageously is simply sewing up that much territory which some other dealer could work to an advantage.

How Can the Truck Sales Managers Build for the Future?*

GENTLEMEN, I think it might be a good idea to open the afternoon's proceedings with a roll call, and I will, therefore, ask all the pessimists to please stand up.

... Nobody arose. ...

This is one of the most remarkable demonstrations I have ever seen! I was told when I came to Detroit that I would find pessimism as thick as a London fog. Possibly we have so many people from outside of Detroit that they haven't gotten the atmosphere.

Now, the reason I speak of pessimism is because I believe that half of all our ills are imaginary. I believe that mental attitude toward any great problem controls the solution of that problem. If we all talk hard times, we are all going to make hard times. I don't mean to say that we can right about face immediately, because we have been too long doing things wrong. When we have great prosperity, unusual prosperity, we are bound to let evils creep into our business, because we become careless. But, there is an old saying that prosperity tries men; adversity makes men.

Now, we have been in the crucible. A lot of us have been tried and a lot of us are going to be remade, and my subject is: "How Can the Truck Sales Managers Build for the Future?" And yet, every man here is concerned in how he is going to take care of his immediate present. But, the present of today was the future of a year ago and we all know that nothing is ever built without a foundation and that the roof which completes the structure does not come into the picture until many days after we have started the initial work of building.

Therefore, we have got to be satisfied to take what there is for us today in the way of business, revamp our views and become constructive so that the future, when we reach it, will be a prosperous present.

This Association is a Sales Managers' Association and its problems are primarily sales. It occurs to me that if the motor truck industry has sought the country over for the brains of sales and distributions, and put them into responsible positions of sales managers, that there must be more in the way of brains in this association than out of it. Therefore, it becomes your duty to determine how you are going to utilize those brains.

Individually, the sales manager may deal with his own troubles. Collectively, he has to deal with the industry's problems and I think the way to approach the subject of cleaning house is to look over and see what we have been doing that is not right.

In trying to analyze the troubles in the motor truck industry, I think the biggest one has been forced sales. The brains of the sales organizations of the motor truck

industry have been devoted to seeing how many cars that sales organization could get out of the factory and not how many cars that sales organization could get into the hands of the ultimate customer.

The practices of paying bonuses and commissions for increasing sales to dealers has unconsciously brought about an evil which is serious in your business. It has caused you to scramble for the immediate dollar instead of building for the future. You have gone into cities where you have shown the dealer how he can get financed to take a carload of trucks from you and then you have said yourself, that you have done the right thing and you beat it out of town and said "to hell with the dealer; he has his troubles, of course, but so have we."

Suppose, on the other hand, you had branches instead of dealers. Would you be satisfied to ship carloads of trucks to your branch houses and then say, "I have no further interest and we will move along." Any factory that would pursue such a policy would go on the rocks because they would sustain the loss both of the retail distribution and the wholesale loss coming from the ill-will of the buyer.

Now, you have got to change your whole attitude toward the dealer. I think that is the crux of the situation today.

Mr. Moock very ably presented his side of the story and, gentlemen, I think what he said should have great weight with you, because he is pointing the way to a better condition in industry and the way is making the dealer better.

The dealer is your sales department just as much as your sales manager or your salesman is in your sales department. He is on the firing line and upon his ability, financial and otherwise, depends your success. If the dealer cannot make money, he cannot stay in business, and if he doesn't stay in business, you will not make money, because there is no profit in continually finding new customers and not having any benefits from old customers.

Now, a few figures to show the changes that take place in the industry may be an interesting sidelight on this subject. In March of 1920 there was added to the Chilton List 9,449 new dealers. In September, 1920, 11,118 dealers. When I speak of dealers, I mean automobile dealers of all kinds. In March, 1920, on the list there were dropped or changed ownership and management, 20,998, and in September, 1920, 22,175. The total new names added since January 1, 1920, are 20,000, dropped or changed 43,000.

Is that a healthy condition in an industry? And who is responsible for it? I think the sales managers, the general managers, the executives and the leading men of the industry are primarily responsible for it, because the dealers are what you make them, and if you make them a dumping ground for your product, you are not making them successful business men. In revamping your sales program, I think your most effective way of going

about taking care of changed conditions is to decide that henceforth the dealer that sells your trucks is a dealer who will sell your truck rather than a dealer who will buy it.

We are now at a period when we have to do what they term in golf, "follow through." We can no longer be satisfied with going half way. The manufacturer's sales problems will be from plant to consumer and not from plant to dealer.

This means that after you reorganize your own business, you have got to reorganize the business of your dealer. He must be put on a basis where he can make a profit and it is vitally to your interest to see that he is not underfinanced or oversold. If he hasn't sufficient capital to satisfactorily buy one truck and put it on the road and sell it right, then he is not a dealer. If he has the capital to buy a hundred trucks, but not the ability and sales organization to sell fifty, then he is the worst kind of dealer for you to have.

The backing-up process in this industry is what has caused the congestion today. This congestion resulted to a great extent from the policy pursued by manufacturers in taking advantage of a seller's market and letting the customer believe that if he did not order about five times as much as he could sell, he would not get anything. The filling-up of the buyer with your product without any possible chance of an outlet has resulted in stagnation, which in turn has resulted in cancellations. This caused a reduced production and now we have the house cleaning period in consequence.

The reason I asked the pessimists to stand up is because I wanted to see if they are all as I am—an optimist. I am thoroughly convinced that America stands today at the top among nations. For ten years we will have the greatest prosperity this nation has ever known and in addition to that, we will start with a clean slate, which is a pretty good thing to do after we have been through this drunken period of reckless extravagance.

But, we must decide to do business on a little different plan, for we will have to think as well as work. For two years we have let our brains and our muscles get soft because we have had things handed to us. In the battle of business, which means a survival of the fittest, we have to harden those muscles and we have to develop those brains and in so doing the motor truck trade has to look for sales fields anew or how to develop the older fields.

To assist you to find new outlets for your product, I have had the Commercial Survey Department of the Chilton Company prepare a number of charts. The compilation of the figures shown were to a great extent obtained from the Department of Agriculture; and it was gratifying last night to have Secretary of Agriculture Meredith intimate to you that the Department of Agriculture was your de-

* Extracts of address delivered by C. A. Musselman, General Manager Chilton Co., before National Association of Motor Truck Sales Managers.

partment. I think if you realized that all the departments at Washington may be used by you, and that in using them you will get lots of facts to assist you in your sales efforts, you would better appreciate the good work of our government.

There are 19,760 dealers in motor trucks in the United States, not necessarily exclusive motor truck dealers, because a large percentage handle both passenger and commercial cars.

Chart No. 1. The outstanding feature of this chart is its general graphic presentation of the fact that the number of truck dealers is not in proportion to farm or industrial wealth of the various states. Note that about the center of production of motor trucks is Ohio. There is a small circle of states surrounding the center of production showing that in our noble efforts to be national distributors, we have worked pretty close to home. Pennsylvania leads in the number of motor truck dealers, with 1,105 agents.

We will for a few minutes go from the subject of dealer distribution to that of farm wealth, and we will start by first finding out where the improved land lies. By looking at chart No. 2 we are able to determine the number of acres of improved land in each state. The black block cover the improved farm land.

So great a part of Iowa is agricultural that when the artist painted the blocks on the chart there was insufficient room to letter the name of the state. A little later you will be presented with facts and figures to show why Iowa is a good motor truck centre and why many commercial cars have already been sold there.

A feature I want to call your attention



Chart No. 1

to in connection with the farm area in each state is that the territory surrounding the circle of states where the motor truck dealers are most numerous is a territory of great farm wealth. By referring to chart No. 1 you will note that this great market for the sale of trucks is poorly cultivated, as dealer representation is below the average.

Chart No. 3 shows farm wealth, based on the thirteen leading crops of the United States, compiled within the last two weeks and taken at the latest prices and from the last census' figures in the Department of Agriculture, and is the first time these

figures have appeared. Again referring to chart No. 1, you will see that the motor truck dealers are congested in the states just inside the circle of agriculture wealth. Does it not, therefore, seem that special sales efforts in this outer circle (see chart No. 3) means greater results to the sales managers? Motor truck cannot be sold where there are no motor truck dealers and motor truck dealers must give service. Hence the way to develop this market is to place more dealers in these rich agricultural states.

Chart No. 4 shows where are located the 18,000 co-operative farm organiza-

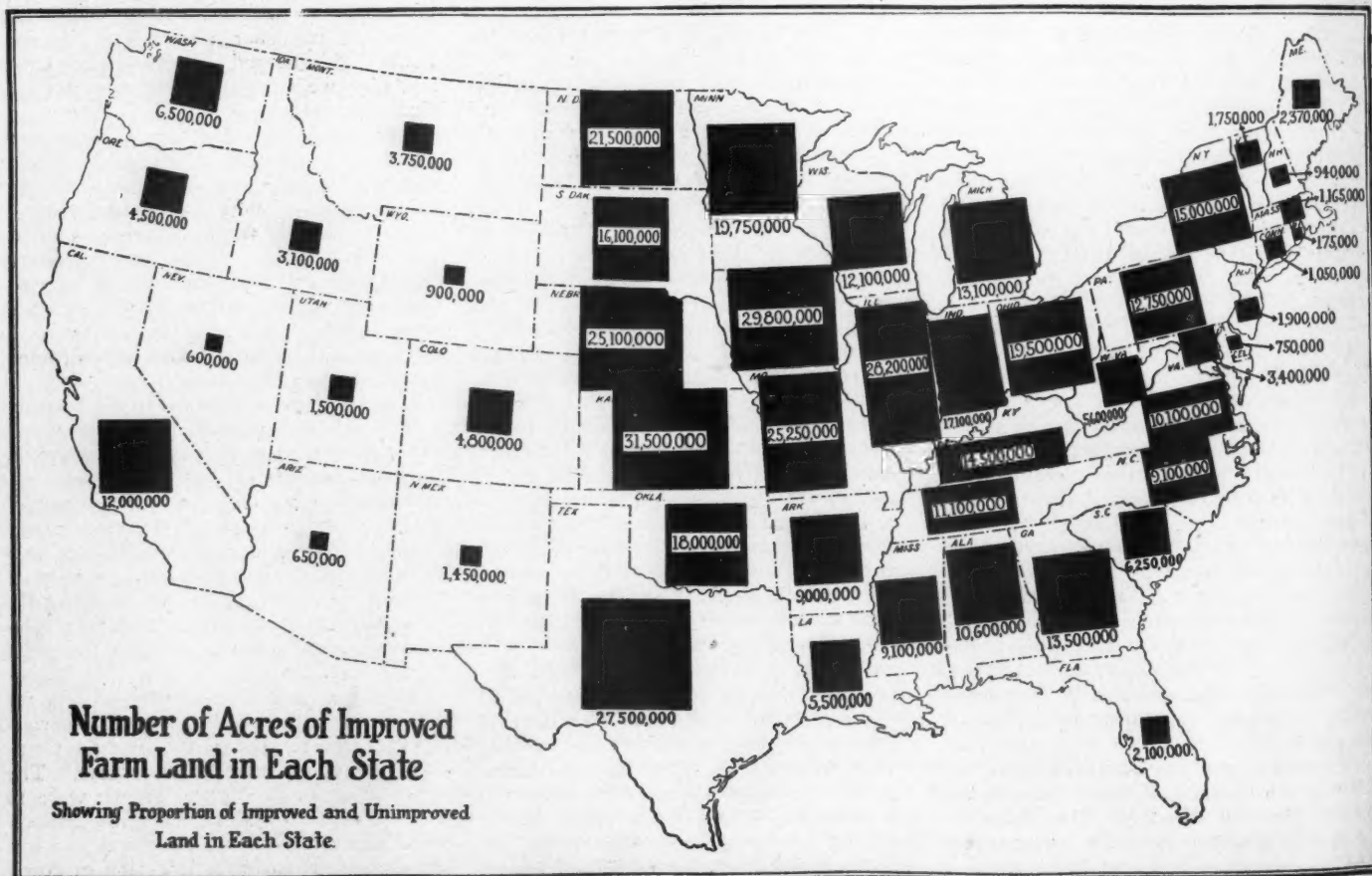


Chart No. 2

We are now in a time when it doesn't pay to duplicate efforts. A great banker was asked, "How did you get a start in life, by saving money?" His answer was, "No, by saving time," and that is your big job now—to save time—and this you can do if you will, but study your market before you try to develop it. These are the commercial days when the student is the man who will succeed.

Here is an interesting comparison. There are 28,200 repair stations operated by dealers; 18,800 repair stations operated by non-dealers. A further analysis shows that most of the non-dealers' repair stations are in the larger cities. The truck dealer of the future in the small towns will, therefore, be recruited from passenger car dealers having service stations.

I believe that the farmer is the shrewd-buyer in America, and not a hayseed. I believe that he will insist upon service as well as quality, and that the service must be near him, not in a large city. I, therefore, think that the dealer of the future in the small town should sell trucks, passenger cars, tractors and farm lighting outfits, for thus he would have a large enough line to be able to maintain a first-class service station.

The reason I am injecting this thought is because I know there is a tendency to say, "We don't want a dealer who handles any other line." I think your first thought should be, "We don't want a man that can't make money." A manufacturer with twenty-five agents prospering has a much more stable business than a manufacturer with a hundred agents, of whom only fifty are prospering. How can a

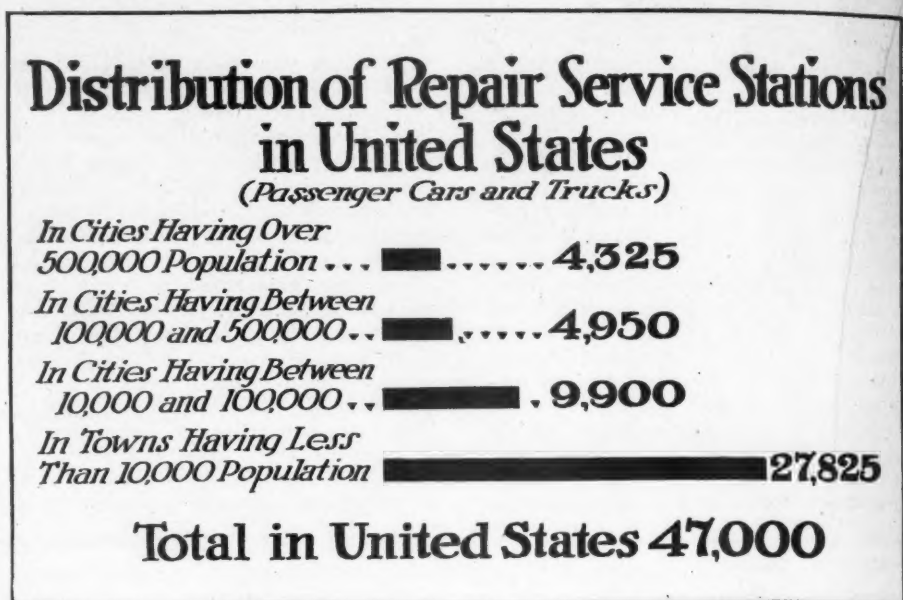


Chart No. 5

maker gauge production if he does not know the uniform sales strength of his dealer organization?

The remarkable thing in connection with these charts is the composite of all. We have been talking a lot about Iowa. It ranks fifth in the number of motor car dealers, eighth in the number of lines carried, second in the number of trucks on the farm. It ranks second in the number of farmers having a hundred acres or more who use trucks, but twenty-fifth in the number of farms of a hundred acres or over for each farm truck in use. It ranks first in the value of the thirteen

leading crops, first in the number of acres of improved land and first in the total value of cultivated farm land. When these facts are so evident, you cannot help but feel that going after the farm market in Iowa is worth while.

Altho Pennsylvania is not considered a great agricultural state, it is first in the number of truck dealers, first in the lines carried, and third in the number of trucks on the farms. And why? If you carry your analysis a little farther, you realize it is third, because there are more motor truck dealers there. It is fifteenth in the number of farms of a hundred acres and

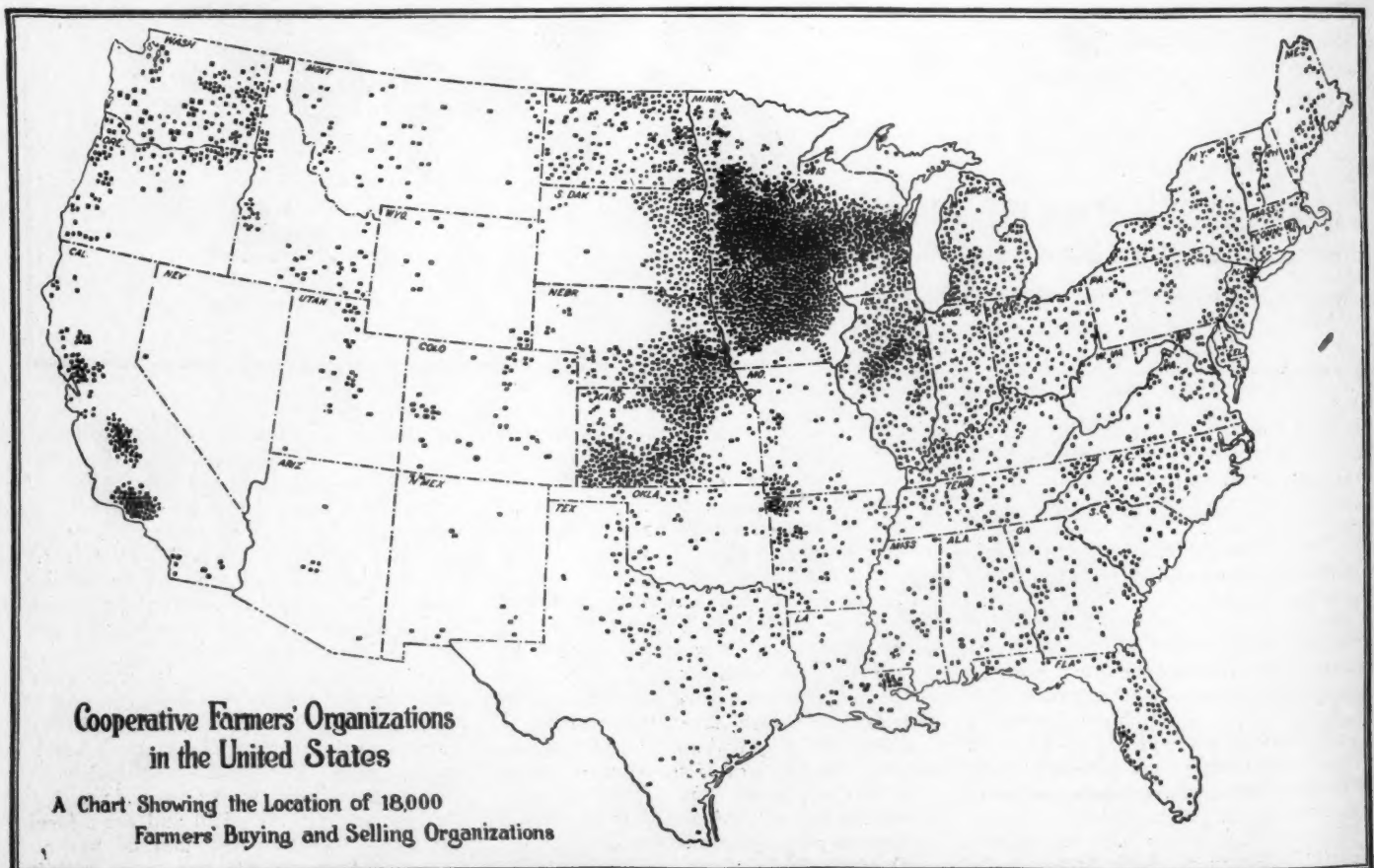
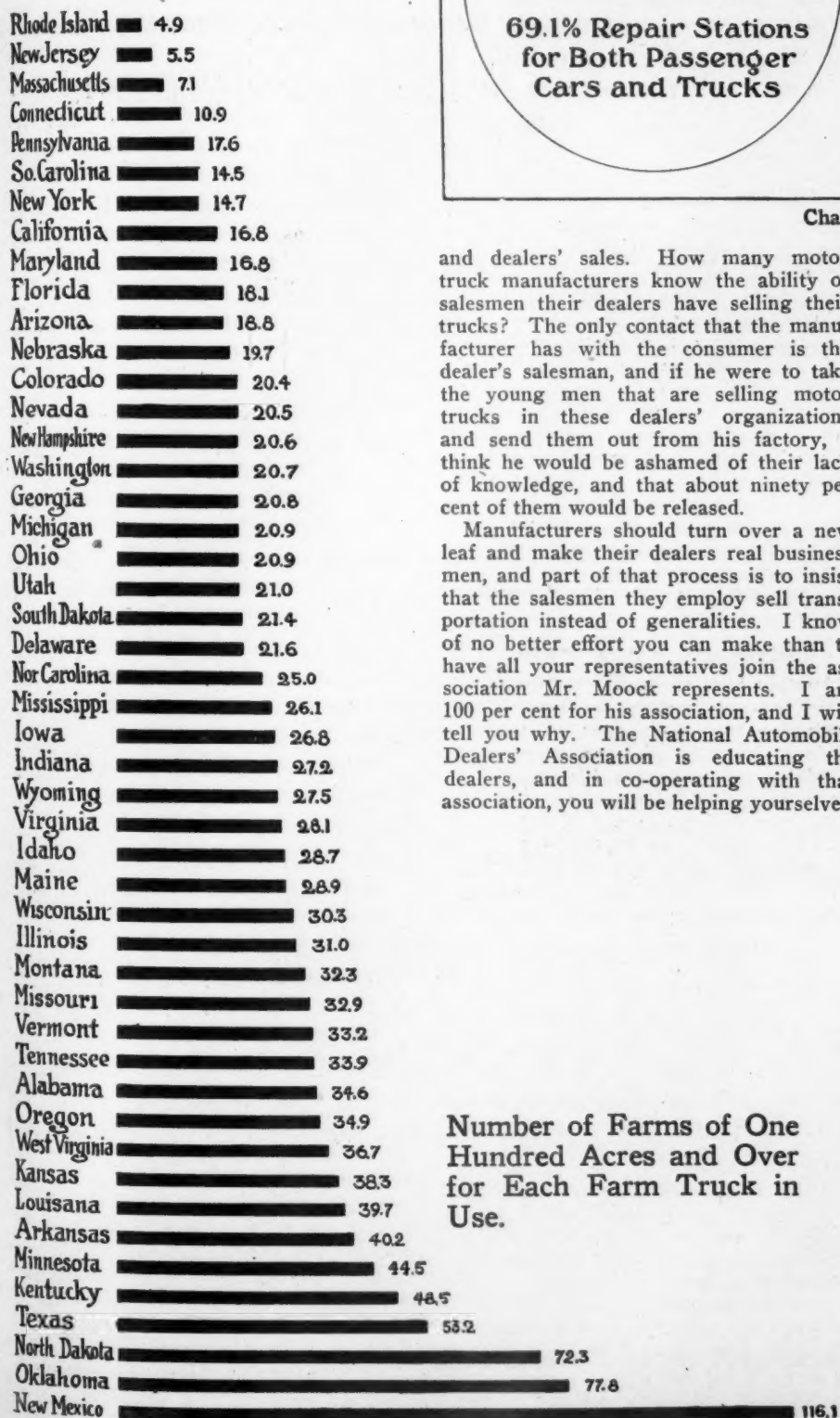


Chart No. 4

over in size. You are supposed to start with a hundred acres to sell a truck. It ranks fifteenth and gets third in the number of trucks on the farm. In the number of farms of a hundred acres or over, each farm truck in use, it is eleventh, in value of crops it is thirteenth, value of improved farm land it is seventeenth, in the total value of cultivated farm land it is sixteenth, and yet it is first in dealers and third in trucks on the farm.

Since we have looked over the charts and gained some idea of how and when and where we ought to sell trucks, let us go back again to the subject of dealers



A Comparison of the Number of Passenger Car and Truck Service Stations in U.S.

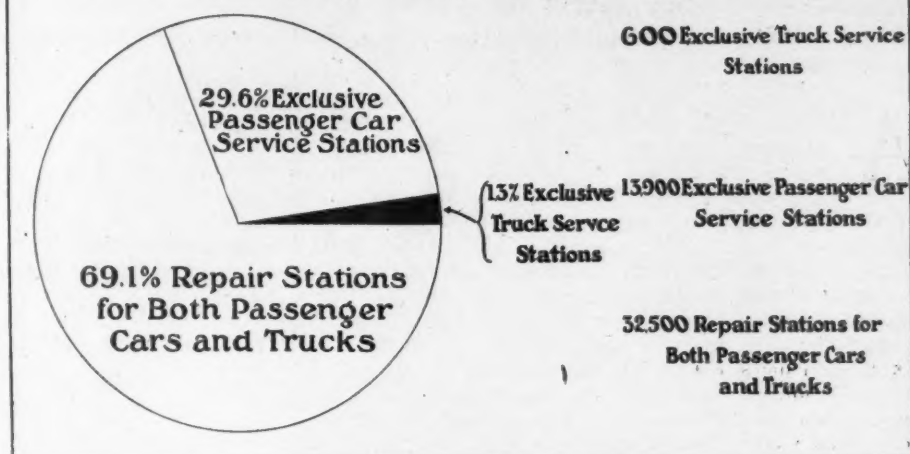


Chart No. 6

and dealers' sales. How many motor truck manufacturers know the ability of salesmen their dealers have selling their trucks? The only contact that the manufacturer has with the consumer is the dealer's salesman, and if he were to take the young men that are selling motor trucks in these dealers' organizations and send them out from his factory, I think he would be ashamed of their lack of knowledge, and that about ninety per cent of them would be released.

Manufacturers should turn over a new leaf and make their dealers real business men, and part of that process is to insist that the salesmen they employ sell transportation instead of generalities. I know of no better effort you can make than to have all your representatives join the association Mr. Mook represents. I am 100 per cent for his association, and I will tell you why. The National Automobile Dealers' Association is educating the dealers, and in co-operating with that association, you will be helping yourselves.

While at this particular period we are interested in a number of things. We just at this moment want to know how the National Association of Motor Truck Sales Managers can utilize their organization for a betterment of the motor truck industry. May I venture to suggest that all of its members agree for three months to devote half of their advertising space to intelligent sales talks on commercial car transportation, and the other half to their own product? The maker's appeal in behalf of his own product would be more forceful if he would complete it with good truck transportation propaganda.

Being a publisher, I have had some experience with the results obtained from advertising the activities of associations, and that experience doesn't make me very enthusiastic for paid publicity over the signature of a trade organization, for such advertising has no individuality, since it represents to the public the arguments of an indefinite group. Any statement it makes carries no weight for that fact. The buyer is not buying from the association.

But, if the buyer is seeking information about trucks and while doing so is unconsciously absorbing constructive arguments in favor of motor truck transportation, and ties that up with what you have to sell him, you are going to make a stronger plea for your truck, while advertising the advantages of motor truck transportation in general. I see a very great future for this association provided that the manufacturers' executives will back the sales managers.

I feel that in the selection of Mr. Boulden for your president, you have a man of experience, vision and energy, and if you will whole heartedly support him during the next twelve months, you should be able to cure many of the industry's ills.

In offering these suggestions to the association, it is with all sincerity and from the heart. I want to see more motor trucks sold; I want to see them sold better, and I want to see this association the leader in that great movement.

Truck Service Managers Have Their Innings at Cleveland Meeting

See Need for Closer Co-operation Between Factory and Dealer Service Men, Also Between Factory Service and Sales Departments

By C. P. SHATTUCK

ASIDE from the passenger car atmosphere which prevailed in the papers and discussions, the convention of the service managers of the passenger car and motor truck industry, held under the auspices of the National Automobile Chamber of Commerce at Cleveland, November 9 and 10, was a success from the service standpoint. The sessions were well attended. Excellent papers read dealt with many service problems, both from the factory service manager's viewpoint and the dealers' as well. The discussion teemed with constructive criticisms and suggestions and throughout there was a lack of restraint that was prevalent at the former conventions. The service managers were primed for heart-to-heart talks on service and in summarizing the sessions it may be stated that from the candid expressions made it is very evident that the factory executives are backing up the movement for better service conditions in the industry.

Convention Was Productive

It was an excellent convention from a passenger car standpoint. True, many of the pertinent suggestions made could be applied to the motor truck industry or its service, but even one not connected with the industry could have easily detected the passenger car note that ran through the papers and talks. However, the truck men were not slighted. On the last afternoon the commercial car men had an opportunity to listen to two papers. One was by a strictly truck service manager and the other by a company producing both passenger cars and trucks.

Both papers were excellent, particularly that read by the truck man. Both drove home points in service that could be utilized in practice by the passenger car men, but at the conclusion of the papers there was little discussion, although nearly 13 per cent of these in attendance were exclusive truck service managers; in fact, Chairman A. B. Cumner had to start the ball rolling after each paper. Perhaps the service men has discussed service from so many angles that there was little left to dissect at the conclusion of the truck papers. But in the discussions following some of the speakers viewed the subjects through the spectacles of the passenger car industry. It was interesting to note, however, that one speaker remarked that while service was service there was this difference: That the owner of a motor truck expected the dealer to keep the truck on the road and not in the shop—intimating that the service was not measured in dollars and cents by the owner.

There were three high spots in the papers and discussions. The foremost point was that more consideration must be given to the dealer by the factories in educating the dealer to the value of service from the sales standpoint. More than one speaker declared that the potentiality of a manufacturer's market in the future would be measured by the satisfied customer.

More Consideration for Dealer

George C. Hubbs, vice-president of a passenger car company who opened the convention with a real, snappy and keen analysis of service requirements, hit the nail on the head when he said that service should begin at its source—the factory—and that service consisted in selling satisfaction to the customer. He aroused much enthusiasm when he said that the factory service manager should be an associate of the sales manager and chief engineer and should have some say in factory policies insofar as they affected service and satisfied customers. Criticism was directed at those manufacturers whose policy is to allow the wholesale men to go their own gait. The contention was also made that the factory must instruct the service heads of dealers how to merchandise service and give satisfaction.

Service and Future Market

Another high spot was the keynote of dealer co-operation in service and the realization that a closer study must be made of his problems and effort made to educate those dealers who are not as yet sold on the value of service as the foundation of future sales. One and all of the speakers were cognizant that the market today was a buyer's market and that competition will have a decided influence in sales in 1921 and thereafter.

Must Have Good Equipment

The third feature was the emphasis laid on the vital need of the service station and repair shop employing time and labor-saving tools, machinery and equipment. Several speakers declared that the small or larger shop not so equipped could not turn out satisfactory work in the minimum of time and would shortly be replaced by the large service station having the proper personnel, a real service manager and departments headed by practical and efficient men.

Among the papers read was one by Service Manager Paul Williams, of the H. H. Franklin Manufacturing Company. He said that tools were developed to reduce the time of operations in a special department and that consideration was given to providing for use of the

tool for more than one purpose. He said that the mechanics of the dealers appreciated the tools and that they were instrumental in developing more efficient workmen.

There were a number of discussions on subjects close to the service manager and dealing with the warranty, parts makers, etc., and the analysis of these is that the service managers expressed themselves as believing that a better understanding between parts and equipment makers and the factory service managers would improve service to the owner. In this connection it would not be surprising if representatives of parts and equipment makers were invited to attend the next convention, or be present at a part of the sessions when the service men again convene, which they will do at Buffalo, N. Y., probably in the spring.

Cleveland Gives Good Service

The local committee, comprised of Cleveland factory service men, gave an example of Cleveland's service in hospitality. The theatre party and dinners tendered the visitors as well as the arrangements for visiting certain factories the day following the close of the convention set a mark for the Buffalo boys to shoot at when it comes their turn. Considerable credit is due the Cleveland committee which comprised E. D. Pugh, Peerless; M. Bleiweiss, Templar; J. B. Bray, Grant; W. H. Doddridge, Winton; R. M. Fraser, Chandler; J. H. Harris, White; J. T. Nicholson, Cleveland; E. M. Schmitz, Jordan, and C. G. Snider, Stearns.

The service committee was headed by A. B. Cumner, Autocar, and included F. A. Bonham, Chevrolet; J. B. Bray, Grant; F. Van Z. Lane, Locomobile; C. R. Lester, Packard; L. C. Volyes, Marmion; F. J. Wells, Pierce-Arrow, and H. R. Cobleigh, N. A. C. secretary.

Dealer to Receive Company Stock Bonus

A unique plan for stimulating sales among dealers has been devised by the Pro-Mo-Tor Fabricating Corp., 182 Locust Ave., New York City, manufacturer of Herz plugs, "Bougie Mercedes," oscillums and other products. This corporation has set aside one-sixth of its capital stock to be distributed free among its dealers in proportion to their sales. The firm states that there is no preferred stock, no bonds or debentures outstanding.



EDITORIALS



Changing Buyer's Attitude of Mind

FIGURATIVELY speaking, a year or so ago motor trucks were selling themselves. Many motor truck salesmen were resting on their laurels. Very little attention was given by the retail trade to the principles of merchandising in connection with the sale of motor trucks. It was simply a case of taking orders and enjoying the good fortune of being able to make deliveries. The buyer was also in a different frame of mind. He was more approachable in those days; he was making money faster than now, especially in some lines of endeavor. Borrowing money was an easy matter—in fact, taking it all in all, the business world was so intent on manufacturing and production that little attention was given to sales problems. There weren't any.

Almost over night, however, this condition reversed itself. The market changed from a seller's market to a buyer's market. In other words, the public simply laid off buying—for a while—mainly of such things which it can do without momentarily. But the public has not stopped buying altogether. It is simply more cautious in making its purchases. It is still laboring under the illusion that prices will drop still further, consequently it is holding off. Much of this condition is the retailer's fault. The inherent trouble with the retailer is that he does not try to sell the customer in the proper manner. He is too apt to cover his wares with "price reduction" tags which immediately give the buyer the impression that he is forced to sacrifice his merchandise and it becomes a question of who can hold out the longest.

The same condition applies in the motor truck field. The dealer has not sold his customer properly in the past and, therefore, he is slow in becoming used to the new order of things. The dealer must sell his prospect not only on the merits of his product, and its place in the scheme of things relating to transportation, but he must also change the buyer's mental attitude towards business in general.

However, before the dealer attempts to sell his prospect on such a program he must thoroughly sell

himself. He must visualize the great future of the truck industry, the great agricultural field that has hardly been scratched. He must also make up his mind that from now on he must work a great deal harder—competition will be keener.

The dealer who does this will not experience any difficulty in increasing his business. Simply stringing banners across a show window, telling the public that the price has been reduced a few hundred dollars, will not sell those trucks or passenger cars or whatever it may be. The greatest handicap to the industry is psychological. Changing the mind of the buyer is a task which the industry must tackle immediately. There is a good, healthy market awaiting the truck industry. But it must be sold in a new way. The dealer must forget his old ways in doing things. He must change his own attitude of mind and make a determined effort to run his establishment differently—he must do so if he wishes to stay in business. He will be the better for it eventually.

Put It Up to Your Congressman

CONGRESS is again in session and it is expected that the Townsend bill will come up before Congress about December 28th. The pros and cons of this bill have been discussed in this publication quite frequently in the past and it is not, therefore, our purpose to reiterate the contents of this bill. By now every man in the trade should be familiar with the object of this bill and if he is not, he is certainly very little interested in his business.

If every man who reads these lines will make it a point to write to his Congressman immediately to the effect that he should support this bill, he will have done something that will be of benefit to himself and the industry.

It may also be timely to state that beginning with next month 5,000 bills will be proposed in the 42 legislatures of this country and there will be many a bill proposed that will be inimical to the welfare of the industry. Do your part to prevent these bills from becoming laws. Join the National Automobile Dealers' Association which is spending its best efforts to fight drastic legislation.

Selling is a Little Harder, But the Market is There

News of the Trade in Brief

(For Factory Items, Personals, New Incorporations, Etc., See Pages 110-112)

International Makes a Number of Appointments

A number of important changes and additions have been announced by the International India Rubber Corp., of South Bend, Ind., in its personnel.

R. J. Fitzgerald, formerly district sales manager of the McGraw Tire & Rubber Co., at Indianapolis, Ind., has been appointed assistant sales manager succeeding C. H. Mayer, resigned. Ray Thurman, formerly of the McGraw Co., will handle the corporation's tires on the Pacific Coast.

Claude Hartwell has been made special factory representative in charge of Indiana, southern Ohio, southern Illinois and states of Kentucky and Tennessee.

Sales representatives have been appointed as follows: H. D. Brown, with headquarters at Wichita, Kan., for Kansas, Oklahoma, Missouri and Arkansas; E. A. Bradley, operating from Lincoln, Neb., northern Kansas, all of Nebraska and western Iowa, as well as part of Mis-

souri; Ray L. Hause, for northern Illinois and the state of Wisconsin, and F. J. Sellers for North and South Carolina, Florida, Alabama, Mississippi and Louisiana. C. H. Fischer with headquarters at Chicago will continue to cover Michigan, northern Ohio, western Pennsylvania and western New York.

Gear Company Makes Extensive Expansions

Recent capital expansions by the Wohlrab Steering Gear Co. has made possible the purchasing of a large factory at Racine, Wis., and the placing of new machinery and equipment that will more than double the plant's former capacity.

Paul Wohlrab, the patentee of the Wohlrab steering gear, will be in charge of engineering and production, with Fred Funke, formerly of the Nordberg Co., as shop superintendent. Sales, purchases and accounting will be directed by T. H. Owen, with E. Prichard, assistant secretary and treasurer, as auditor.

Legion Organizes Motor Transport Post

An American Legion post known as the Motor Transport Post No. 815, Room 503, 1780 Broadway, New York City, has been organized to work with some definite relationship to the automotive industry and especially to the motor transport division of the Transport Service of the War Department. The post, through, a liaison committee, shall be closely in touch with all projects pertaining to peace time preparation for an efficient service in emergency.

It is planned to invite officers of the regular army and experts in various lines connected with the automotive industry to speak at meetings of the post on topics of general interest to the members.

Meetings have been held in the council room of the N. A. C. C., Marlin Rockwell Bldg., 366 Madison Ave., but it is the intention of the post after a sufficiently large membership has been attained, to have its own club rooms.

SHOWS

December 25, 1920 to January 1, 1921—Akron, Ohio. Auto Show, Central Garage (34,000 sq. ft.) Passenger Cars, Trucks, Tractors & Accessories. E. T. Jones, Mgr., Akron Automobile Exhibition Co.

January 1921—Toledo, Ohio. Thirteenth Annual Show. Passenger Cars, Trucks, Tractors & Accessories. Terminal Auditorium. H. V. Buelow, Mgr.

January 3 to 8, 1921—New York, N. Y. Truck Show of the Motor Truck Association of America, Twelfth Regiment Armory, Columbus Ave. at 62nd St. Trucks and Accessories. T. D. Pratt, Gen. Mgr., 1790 Broadway, New York City.

January 8 to 15, 1921—New York City. Twenty-first National Show. S. A. Miles, Mgr., 366 Madison Ave., Grand Central Palace. Passenger Cars & Accessories.

January 16 to 22, 1921—Schenectady, N. Y. Company E, F and Machine Gun Co. State Armory. J. J. Callahan, Mgr., Box 1186, Pittsfield, Mass.

January 17 to 23, 1921—Milwaukee, Wis. Thirteenth Annual Show, Auditorium (102,000 sq. ft.) Passenger Cars, Trucks & Accessories. Bart J. Ruddle, Mgr., 316 Brumder Bldg., Milwaukee, Wis.

January 22 to 27, 1921—San Francisco, Cal. Second Annual Pacific Coast Automotive Equipment Exposition, Exposition Auditorium. Accessories & Equipment. F. R. Quigley, Mgr., 2nd Floor, Exposition Auditorium, San Francisco.

January 22 to 29, 1921—Baltimore, Md. Annual Automobile Show, at Fifth Regiment Armory auspices of Baltimore Automobile Dealers' Assn., Inc. John C. O'Brien, Gen. Mgr.

January 22 to 29, 1921—Montreal, Canada. National Motor Show of Eastern Canada. Motordrome Bldg., auspices of Montreal Automobile Trade Assn., Ltd. Passenger Cars, Trucks, Tractors, Motorcycles, Bicycles, Aeroplanes, Motor Boats & Accessories. Victor Levesque, Mgr., 228 Sherbrooke, East Montreal.

January 23 to 29, 1921—Amsterdam, N. Y. State Armory. J. J. Callahan, Mgr., Box 1186, Pittsfield, Mass.

January 29 to February 5, 1921—Chicago, Ill. Coliseum and First Regiment Armory. Passenger Cars & Accessories.

January 30 to February 5, 1921—Hudson, N. Y. State Armory. J. J. Callahan, Mgr., Box 1186, Pittsfield, Mass.

January 31 to February 5, 1921—London, Ontario. First Annual National Motor Show of Western Ontario, under auspices of Automotive Retailers' Association, Armories. Passenger Cars, Trucks, Tractors, Accessories, Motorcycles & Bicycles. T. C. Kirby, Mgr., London Motor Club, London, Ont.

Coming Events

February, 1921—Nashville, Tenn. Allen Parkes, Mgr., Care Chalmers Company of Tennessee.

February 5 to 12, 1921—Minneapolis, Minn. Winter Show. Walter R. Wilmot, Mgr., 709 Andrus Building.

February 7 to 12, 1921—Columbus, Ohio. National Tractor Show. State Fair Grounds. W. W. Whaley, Springfield, Ohio, Gen. Mgr.

February 12 to 19, 1921—Kansas City, Mo. Fourteenth Annual Auto Show. E. E. Peake, Mgr., 1019 Floyd Bldg. Passenger Cars, Trucks and Accessories.

February 12 to 19, 1921—Hartford, Conn. Fourteenth Annual Show, Connecticut State Armory. Passenger Cars, Trucks, Tractors & Accessories. Arthur Fifoot, Acting Mgr., 135 Church St., Hartford, Conn.

February 13 to 19, 1921—Fitchburg, Pa. First Annual Show, State Armory, Benefit of Co. I & K. William H. Partlan, Mgr., Box 1453, Pittsfield, Mass.

February 14 to 19, 1921—Waterbury, Conn. Second Annual Show, Maltby's Garage, auspices of Waterbury Automobile Dealers' Assn. G. A. Parsons, Mgr., P. O. Box 729, Waterbury, Conn.

February 14 to 19, 1921—Winnipeg, Canada. Western Canada Automotive Equipment Show. Accessories & Equipment. W. L. Williams, Secy, care of Motor in Canada, Winnipeg.

February 19 to 26, 1921—Albany, N. Y. Probable Date.) Twelfth Annual Show, State Armory (40,560 sq. ft.) Passenger Cars, Trucks & Accessories. J. B. Wood, 28 Howard St., care of Albany Garage Co., Albany, N. Y.

February 19 to 26, 1921—Newark, N. J. First Regiment Armory, auspices of Newark Auto Trade Assn. Passenger Cars, Trucks and Accessories. Claude E. Holgate, Mgr.

February 19 to 26, 1921—San Francisco, Cal. Fifth Annual Show, Exposition Auditorium (85,000 sq. ft.) Passenger Cars, Trucks, Tractors & Accessories. G. A. Wahlgren, 215 Humboldt Bank Bldg., San Francisco, Show Mgr.

February 21 to 26, 1921—Grand Rapids, Mich. Twelfth Annual Show, Furniture Exhibition Bldg. (54,000 sq. ft.) Passenger Cars, Trucks, Tractors & Accessories. M. D. Elgin, Mgr.

March 1 to 5, 1921—Quincy, Ill. Third Annual Show, Armory and adjoining building. (20,000 sq. ft.) Auspices of Quincy Automobile Trades Assn. Passenger Cars, Trucks & Accessories. J. W. Hatt, Secy, care of Whig Journal, Quincy, Ill.

March 1 to 5, 1921—Wichita, Kan. Second Annual Show. Exposition Bldg. (75,000 sq. ft.) Auspices of Wichita Motor Trade Assn. Passenger Cars, Trucks & Accessories. Henry B. Marks, Box 372, Wichita, Kan.

March 7 to 12, 1921—Indianapolis, Ind. Twenty-second Semi-Annual Show. John B. Orman, Mgr., 338 North Delaware Ave. Passenger Cars, Trucks, Accessories and Farm Lighting Outfits.

March 7 to 12, 1921 (Probable date)—Paterson, N. J. Fifth Annual Auto Show. Fifth Regiment Armory. Passenger Cars, Trucks, Tractors and Accessories. H. MacGinley, Paterson, N. J., Manager.

March 12 to 19, 1921—Boston, Mass. Annual Show, Mechanics Bldg. and South Armory.

March 14 to 19, 1921—Omaha, Neb. Sixteenth Annual Automobile Show, Auditorium, Omaha Automobile Trade Assn., Inc. C. G. Powell, Mgr., 2051 Farnam St., Omaha.

March 15, 1921—Fort Worth, Tex. Twenty-fourth Annual Southwestern Exposition & Fat Stock Show. Passenger Cars, Trucks, Tractors. M. Sansom, Jr., Sec'y.

March 20 to 26, 1921—Torrington, Conn. Company M. State Armory. J. J. Callahan, Mgr., Box 1186, Pittsfield, Mass.

April 4 to 9, 1921—Seattle, Wash. Third Annual Show, Arena & Hippodrome (40,000 sq. ft.) Passenger Cars, Trucks & Accessories. Wm. J. Coyne, Secy, 1321 Seneca St., Seattle.

CONVENTIONS

Chicago, Ill., January 31 to February 1, 1921—Annual Meeting N. A. D. A.

Chicago, Ill., February 2, 1921—Winter Meeting Society of Automotive Engineers, Hotel Morrison.

Milwaukee, Wis., January 19, 1921—First Annual Convention of the Wisconsin Automobile Dealers' Assn.

Minneapolis, Minn., January 11 to 13, 1921—Annual Convention of the Minnesota Implement Dealers' Association, West Hotel. C. I. Buxton, Sec'y, Owatonna, Minn.

New York, January 11 to 13, 1921—Eleventh Annual, Society of Automotive Engineers, Hotel Astor.

FOREIGN EVENTS

Buenos Aires, Argentina—November, December, 1920—National Exposition of United States Manufacturers.

Brussels, Belgium—December 10 to 19, 1920—First Post-War Show, Palais du Cinquantenaire, auspices Chambre Syndicate de l'Automobile.

Ceylon, India—January 22 to 29, 1921—Automobile Show, auspices Ceylon Motor Show Syndicate.

Sydney, Australia—January 7, 1921—Australian Motor Show.

Utrecht, Holland—Spring, 1921—Fifth Annual Industrial Fair, with International Exhibits.

Timely Work on Electric Systems Issued

The American Bureau of Engineering, Inc., 1601-03 S. Michigan Ave., Chicago, Ill., is placing on the market a series of manuals on the internal wiring of the various starting and lighting systems, a work which will fill a growing need in the life of the repair and garageman.

The series, of which there will be 28 volumes in all, will cover accurately every generator and motor which has been made use of on American made automobile trucks, tractors and motorcycles.

According to the publishers the manuals will contain the following information: Internal wiring diagrams, complete description of details of construction, design and operation of any starting motor, generator, voltage regulator, current regulator, cutout, starting switches, data on starting motor torque, speed and current consumptions, data on generator outputs at various speeds and voltages, instructions for setting voltage regulators, instructions for third brush generators, instructions for setting cutouts for opening and closing, descriptions and instructions for drive mechanism used with starting motors, instructions for tests to be made on car and on bench, etc.

The Autolite, Gray & Davis, Remy, Delco and Westinghouse systems are off the press, others are in the process of preparation.

School Children to be Taught Rules of the Road

Inclusion of courses designed to teach children the "Rules of the road" will be urged upon school officials throughout the United States shortly by the textbook committee of the highway and highway transport education committee of the Bureau of Education. While it is yet too early to say definitely what the recommendations for these courses will contain, some indication can be obtained from studies which are already under way in the Detroit public schools as well as in some others.

In Detroit, for example, the work starts with the kindergarten, where the child is taught to exercise care in crossing streets, always waiting on the corner until he is sure that nothing is approaching within a half block.

Later, as the child progresses to the elemental grades the course is broadened and the element of personal responsibility enters into the course, together with more detailed instructions as to rules of safety, always in language which is easily understood and which is confined to fundamental principles.

As a further point which will be emphasized, it is hoped that to a certain extent, at least, parents may be reached through their children, as the child's interest in his lessons will naturally lead to his describing them to his elders.

Highway Council Takes Up Road Failure

Efforts to arrive at the cause of highway failure are being made by the Federal Highway Council, which includes prominent engineers, highway officials and scientific men in leading universities. Under the chairmanship of General T. Coleman DuPont the sub-grade committee of the council met at Wilmington, Del., November 22 and 23.

Among the scientific men attending were Professor Hector J. Hughes, dean Harvard Engineering School, Cambridge, Mass.; A. T. Goldbeck, testing engineer, Bureau of Public Roads, Washington, D. C.; Prof. F. H. Eno, chair of engineering, Ohio State University; H. E. Hilts, of the Pennsylvania State Highway Department; H. G. Shirley, of the Federal Highway Council, and Ira B. Mullis, Bureau of Public Roads, Washington, D. C.

Reports were made by problem committees working under a main committee. During the meetings various problems were discussed by W. P. Blair, of Cleveland, O.; General DuPont, C. M. Upham, state highway engineer of Delaware; H. G. Shirley and S. M. Williams, chairman of the Federal Highway Council.

Investigations in widely separated sections of the United States are to be conducted simultaneously and reports made at subsequent meetings of the sub-grade committee. The work is under the direction of the Federal Highway Council, which hopes through the movement now undertaken to save millions of dollars to the public in the future in the construction of roads that will not fail.

No Truck Show at Des Moines

Des Moines will have no motor truck show this year. This was decided at a meeting of the Motor Truck Dealers' Association, November 15. Inasmuch as the annual passenger car show is to be held in the Des Moines Coliseum, where there is not room to stage both shows at once, the truck dealers decided it would not be worth while to stage the show in another building at the same time, as experience has proved that the crowds will not go from one building to another to see motor trucks.

Business conditions in the Des Moines territory are not conducive to any great outlay at the present time for show purposes, according to the dealers. Iowa farmers are holding crops on which they are offered prices below the cost of production, and even though they sell they will not be in position to buy trucks during the coming year.

The Des Moines motor truck dealers are going to make a strong bid for attention during the annual passenger car show, however. During the week of the show, March 2-10, the commercial car dealers will have fine displays on the floors of their salesrooms and will make every effort to have out-of-town dealers and truck prospects visit their places of business while in the city.

Des Moines now has 34 commercial car dealers, distributing 46 makes of trucks.

Hares Motors Control Kelly-Springfield Trucks

The latest acquisition to the Hares Motors line is the Kelly-Springfield truck, according to an announcement made public by Emlen S. Hare, president. Hereafter the firm will operate the Kelly-Springfield Truck Co., and its big plant at Springfield, O. This makes the fourth company to come under the operating control of the Hares Motors, Inc., the others being the Locomobile, Mercer and Simplex.

The manufacture of Riker trucks at the Bridgeport, Conn., plant will be discontinued and the factory devoted entirely to the manufacture of Locomobiles.

Coincident with Mr. Hare's announcement comes the word that the board of directors of the Kelly-Springfield Motor Truck Co. has elected the following officers: President, Emlen S. Hare; vice-presidents, Henry Lansdale, H. D. Church, and O. E. Hunt; secretary and treasurer, F. R. Hickman. These men now hold the same respective positions in Hare's Motors, the Locomobile Co. and the Mercer Motors Co. James L. Giddes, who has been president of the Kelly-Springfield Company, was elected chairman of the board.

William G. Toland has been appointed general truck sales manager. He will be stationed at the general offices of Hares Motors, 16 W. 61st St., New York City.

Many New Appointments in Bosch Corporation

The American Bosch Magneto Corp., of Springfield, Mass., has made a number of new changes in its sales personnel. Both the branch and main office forces have been enlarged.

T. C. Miller, who had charge of the New York branch, has been advanced to the position of district sales manager for the eastern district. W. G. Brown, formerly branch manager at Chicago, has been made district sales manager of the western district. M. Tost, former manager of the Detroit branch, has been advanced to the position of district sales manager for the central district.

At the New York branch O. S. Stanley, who formerly acted as assistant branch manager, has been made manager. The new manager of the Chicago branch is A. K. Chambers, formerly of the general sales department at Springfield, Mass. R. S. Davey, until recently sales manager of the Bethlehem Motor Truck Company at Allentown, Pa., has been appointed branch manager at Detroit.

A traveling tire repair school is the latest innovation of the Miller Rubber Co., of Akron, O. In each city the sessions of the school are held in a centrally located hotel easily accessible to the automobile district. There are both afternoon and evening meetings. Formal addresses are followed by round-table conferences.

Accessories Branch Benefited by Timely Discussions

Recognizing the fact that keen sales methods are the solution of the accessory market for the next year, members of the Automobile Accessories branch of the National Hardware Association of the United States assembled in convention at St. Louis, November 30 and December 1, 2 and 3, came away from the meeting with brighter outlooks for the future and a closer understanding between the jobbers and manufacturers.

The accessories exhibit held at the St. Louis Coliseum in conjunction with the convention represented 308 manufacturers. Capt. Robert E. Lee, manager of everything automotive in St. Louis, staged the show.

Sessions of the association were held in the south balcony of the hall during the morning hours and were largely attended. Jobbers and manufacturers alike were wanted at the meetings and they attended to a man.

A. H. Decatur, of Decatur & Hopkins Co., Boston, president of the association, presided at the opening session and in his annual address emphasized the thought that in these times jobbers should give much more constructive thought to their business, and must pursue their way as though nothing unusual was going on.

President Decatur turned the chair over to A. H. Nichols, of Buhl Sons Co., Detroit, who is chairman of the automobile accessories committee. The latter presided at all subsequent meetings.

A very interesting discussion on the probable developments of the accessory market during 1921 took place. Those participating urged the jobbers to look ahead as much as possible and to order now along the lines soon to be demanded, so that the manufacturers could keep their plants going. They also urged better training of salesmen so that the jobbers could put representatives on the road instead of "peddlers" and "order takers."

Other constructive and interesting speeches were made by A. L. Shapleigh, of the Shapleigh Hardware Co., St. Louis; W. S. Sherwood, Champion Ignition Co., Flint, Mich; W. D. Bigger, president of the American Hardware Manufacturers' Association, River Peterson; D. D. Akers, King Hardware Co., Atlanta, Ga.; J. T. Donahue, of the Moto-Meter Co.; W. R. Hay, of Kelly-Howe-Thomson Co., Duluth; S. Edward Rose; Felix Van Cleef, of Van Cleef Bros., Chicago; F. J. Tenk, of the Tenk Hardware Co., Quincy, Ill., and Edwin O. Faeth, of Stowe Supply Co., Kansas City, Mo.

Cleveland, Detroit, St. Louis and Atlantic City made bids for next year's show, but Atlantic City was voted the preference by an overwhelming majority. The executive committee of the association will doubtless take this into consideration in naming the place for holding next year's show.

Arrangements for this year's meeting and show were in charge of T. James Fernley, secretary-treasurer of the association. The St. Louis committee was headed by H. W. Geller, of Geller, Ward, Hasner, St. Louis.

G.M.C. Control Goes to duPont and Morgan Interests

Transaction Representing \$45,000,000 Cash and Securities Change Hands

By the acquisition of 3,000,000 shares of General Motors Corp. stock, the duPont and J. P. Morgan & Co. interests now gain control of America's largest industrial enterprise outside of the United States Steel Corporation. The colossal transaction means the transfer of control of such products as the G. M. C. trucks, the Buick, Cadillac, Chevrolet, Oldsmobile, Scripps-Booth, Samson tractor, and such well-known accessory manufacturers as Hyatt, Klaxon, Remy, Delco, Champion, Fisher Body, as well as a great quantity of equally well-known general automotive product producers.

The speculative holdings of W. C. Durant, president of General Motors, were obtained through a newly organized holdings corporation, known as the duPont Securities Co., of Wilmington, Del., with Pierre S. duPont as president.

On November 30, Mr. duPont was also elected president of the General Motors Corp. to succeed Mr. Durant, whose resignation was accepted. The latter stated that he desired to retire temporarily from active service for a much-needed rest. The opinion is expressed, however, that he will later on become chairman of the board of directors.

No changes are anticipated in other offices nor in the conduct of the corporation's affairs, and no further expansion is looked for in the near future.

Persistent rumors of the proposed control of the Stutz and Willys-Overland Co. by the new Morgan-duPont interests have been denied by those in authority and seem to lack foundation. However, the possibilities afforded by this combination of interests with limitless capital are enormous.

Union Opposes Proposed Government Automobile Tax

Seeing calamity in the proposal to increase the federal tax on non-commercial cars to 10 per cent. and that on commercial trucks to 8 per cent., representatives of automobile works in Detroit have filed a letter of protest against the proposal with Secretary of the Treasury David F. Houston.

In their letter the workers point out that the automobile is no longer a luxury, but an essential industry, necessary to all lines of business, and the transportation facilities of the country. An increase in the tax of some luxury industry is suggested.

"To increase the tax on passenger cars and trucks is to curtail their production," the letter states, "thus hampering every industry and activity that is depending on automotive power for its prosperity and development."

The communication was sent to the secretary of the treasury following a resolution adopted by the board of administration of Local 127, United Automobile, Aircraft and Vehicle Workers' Union, Detroit.

Progressive Steps Taken by Indiana Truck Men

INDIANAPOLIS, IND.—Better highways for the use of the motor truck, making the truck more utilitarian, and increased taxation for that purpose, is the program of the motor truck owners, represented by the membership of the Indiana Transfer and Warehousemen's Association, which met in convention here recently. Motor truck operators from all parts of the state were in attendance and with them, seeking the points of view of the truck owners, were motor truck dealers of Indianapolis and other cities.

A program for the coming session of the legislature was formulated to bring this about. This program will be sponsored during the coming session of the legislature. In fact, the motor truck owners and dealers are organizing for legislative work—organizing to further their own constructive program and at the same time to be ready to combat some proposed inimical measures.

One new measure to be introduced into the legislature would increase the amount of money now received by the state through registration of motor vehicles for road maintenance. The proposed measure would increase the registration fee of trucks from \$5 to \$7 and in addition would tax motor trucks on the basis of \$5 for each ton capacity. It is proposed to exempt from the tax city trucks which will not use the highways. This measure would take the place of the Dean law, passed in the 1919 session, but declared unconstitutional.

Legislation to prevent late graveling of roads, as was done this year, will be asked. Had there been early freezing this year in Indiana, it is pointed out, the roads would have been impassable for motor trucks and would have been very destructive to automobile tires.

A committee was appointed to study road building from the motor truck point of view and keep in touch with the requirements of the federal highway commission in road tests and to report the results to county commissioners and to the state highway commission. Several motor truck owners expressed the opinion that some of the roads being built in the state would not last three years, under the usage of motor truck transportation. The committee is made up of William G. Kreis, S. C. Ninan and E. G. Rexford, of Indianapolis; J. M. Hedges and A. C. Borgman, of Terre Haute.

The association voted to affiliate with the National Association of Commercial Haulers, an organization with 100,000 members, and through this organization to carry an educational campaign in costs, the maintenance of motor trucks and for a better understanding of service, scheduling, loading and co-operation with shippers.

The association is to further a lien law in the next General Assembly, which will permit of the collection of transfer bills.

The following officers were elected for the ensuing year: B. F. Bartlett, of Huntington, president; C. W. Abrahams, Indianapolis, treasurer, and Tom Snyder, Indianapolis, secretary.

Original Features for New York Truck Show

The New York Highway Transportation Show to Do More Than Simply Exhibit Vehicles and Accessories

NEW YORK'S venture in an owners' motor truck exhibit, known as the New York Highway Transportation Show, to be held at the Twelfth Regiment Armory, 62nd St. and Columbus Ave., and the First Field Artillery Armory Columbus Ave. and 68th St., New York City, January 3 to 8, 1921, has substantial promises for an exhibit of real importance. Novel features unattempted at other shows are to be introduced, which should be helpful in a great many ways and further the interest in trucks.

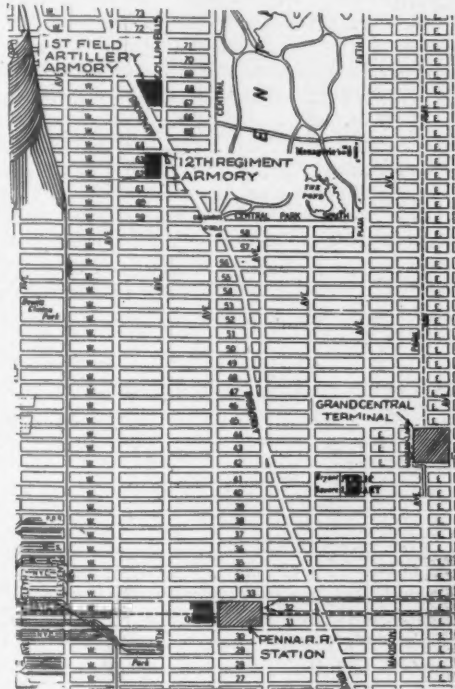
The show embraces a program consisting of a number of special days. Monday, January 3, is to be "Opening Day," Tuesday "Army Day," Wednesday "Motor Accident Prevention Day," Thursday "Highway Transportation Day," Friday and Saturday "Motor Truck Association Day."

The Motor Truck Association of America, under whose auspices the show is held, sets forth the following basic reason and purpose for holding the exhibition: (1) To further demonstrate through discussion and display, the necessity and the advantages of a national highway system which will support the general and economic use of the motor truck. (2) To educate motor truck users. (3) To further educate the general public in the economic advantages derived in the employment of the motor truck as a means of transport.

The exhibition is open to exhibitors in the following lines: Trucks, trailers and accessories, special educational exhibits, including possible entries from the Army, Navy, Department of Interior, etc.; Bureau of Economics; continuous tableau of transportation in all lands; model terminal, model traffic control, evolution of transportation, etc.

The Show Committee states that it is the real desire of the Motor Truck Association that the general public, as well as the motor truck users, attend the show; and the program of events for the six consecutive days is planned to be of interest

to young and old, business man and farmer. Many attractions are scheduled which will be of interest to the entire family—mother, dad and the children. Says the Show Committee: "There is no reason why interest in the motor truck and highway transportation should be confined to the head of the family." Like



Location of Armory Buildings Where New York Motor Truck Show Will be Held January 3-8th.

the railway, the motor truck has become a common carrier and is rapidly becoming a medium of great convenience for every community and for every entire family within that community. The school boy of today is the builder of the great American highway of tomorrow, which will see the motor truck systematically co-oper-

ating with the railways and waterways for the greater prosperity of America. It is thought that the purposes of the show are of such a nature and of such broad scope that no avenue of endeavor but what will be influenced by their final accomplishment.

Included in the program are a series of contests offering valuable prizes to the winner. These prizes will pertain particularly to the special days on which they will be conducted. As soon as detailed plans are completed, rules and awards for these contests will be made public. The program also contemplates a series of educational addresses by many national and eminent authorities on the absorbing subjects of the day.

A new innovation in the Highway Transportation Show is "Motor Accident Prevention Day." Traffic control is now being made a considerable study by our larger cities, and particularly is this true in New York. The Motor Truck Association desires to co-operate with New York City in minimizing the number of accidents daily, caused by careless drivers and a lack of knowledge on the part of the public of traffic regulations.

The Show Committee is now considering a very unique decorative scheme, which will make other New York shows look well to their honors. It is planned that the decorations will not only be spectacular, but a delight to the eye.

For the first time in the history of motor truck exhibitions, the show will be held by a users' organization instead of a dealers' or manufacturers' association; while the show will be held by the users' organization, the details of the show itself will be supervised by a committee of the Dealers' Division of the Motor Truck Association. The personnel of the Show Committee includes A. M. Welch, Reo, chairman; J. A. Inness, Brockway; W. H. Moore, Garford; Paul Campbell, Indiana; R. S. Locke, Federal; W. Lawson, Nash, and E. A. Travis, Locomobile.

LIST OF EXHIBITORS

TRUCKS

Bessemer Motor Truck Co., 540 W. 50th St., N. Y. City.
Brockway Motor Truck Co., 544 W. 38th St., N. Y. City.
Clinton Motors, Inc., Room 916, 116 Nassau St., N. Y. City.
Clydesdale Motor Truck Co., 437 Fifth Ave., N. Y. City.
Corbitt Truck Co., Henderson, N. C.
Fayette Motors Corp. (Ward-LaFrance), 614 W. 57th St., N. Y. City.
Federal Motor Truck Co., 545 W. 57th St., N. Y. City.
Fulton Motor Truck Co., Farmingdale, L. I.
Gary Motor Truck Co., 1133 Broadway, N. Y. City.
Geoffrey Motor Sales Corp. (Parker), 548 W. 53rd St., N. Y. City.
Kuehn & Metz (Atterbury), 87 West End Ave., N. Y. City.
Locomobile Co. of Amer. (Riker & K-S), 22 W. 61st St., N. Y. City.
Lazal Motor Co. (Service), 87 West End Ave., N. Y. City.
Macy Motor Truck Co. (Gramm-Bern.), 30 Halsey St., Newark, N. J.
Manhattan Motors Corp. (Selden), 238 W. 19th St., N. Y. City.
Moline Plow Co., Poughkeepsie, N. Y.
N. Y. Motor Truck Sales Corp. (Indiana), 510 W. 55th St., N. Y. City.
N. J. Motor Truck Co. (Bridgeport), Newark, N. J.
Rainier Motor Corp., 225 W. 58th St., N. Y. City.
Reo Motor Car Co., 1790 Broadway, N. Y. City.
Raskin Bros. Auto Sales Co. (Sandow), 331 E. 103rd St., N. Y. City.
John Simmons Co. (Jumbo), 2130 Broadway, N. Y. City.
Transport Motor Truck Co., Mount Pleasant, Mich.
East'n Trailmobile Sales Co. (Trailmobile), 110 W. 40th St., N. Y. City.
Vim Motor Truck Co., 251 W. 57th St., N. Y. City.
Warren-Nash Motor Co. (Nash), 18 W. 63rd St., N. Y. City.

ACCESSORIES

Adams Trailer, Grand Central Palace, N. Y. City.
American Taximeter Co., 22 W. 61st St., N. Y. City.
Chadick-Delameter Corp., 159 W. 24th St., N. Y. City.
Corey & Co., Jos. C., 354 W. 50th St., N. Y. City.
Durham Co., P. J., 244 W. 49th St., N. Y. City.
Highway Trailer, 501 W. 21st St., N. Y. City.
Hercules Body Mfg. Co., Evansville, Ind.
Hercules Motor Mfg. Co., Canton, Ohio.
Hinkley Motors Co., Detroit, Mich.
Interboro Hoist & Body Co., 407 E. 55th St., N. Y. City.
Lutz Co., Morris & Bambrey Sts., Philadelphia, Pa.
Master Carburetor Co., Los Angeles, Cal.
Metropolitan Body Co., Harris Ave. & Hancock St., L. I. City.
Metropolitan Hardware Co., 32 Vesey St., N. Y. City.
Michaels & Mourre, 344 Amsterdam Ave., N. Y. City.
McCord Mfg. Co., Hancock St., L. I. City.
Parish Mfg. Co., Reading, Pa.
Pruyn Bearing Co., 1902 Broadway, N. Y. City.
Quinlan-Treiber Corp., 5 Columbus Circle, N. Y. City.
Rimco Lubricator Co., Inc., 739 Boylston St., Boston 17, Mass.
Ryan & Hughes, Inc., 1698 Broadway, N. Y. City.
Shults Automotive Co., 16 W. 61st St., N. Y. City.
John Thomson Press & Mfg. Co., 253 Broadway, N. Y. City.
Truck Body Corp., 115 West 54th St., N. Y. City.
Tru-Matic Tire & Tube Co., 207 W. 76th St., N. Y. City.
Wellman-Seaver-Morgan Co., Cleveland, Ohio.



A New Idea for Increasing the Efficiency of Automotive Trade Advertising



THE Chilton Company, publishers of the **Automobile Trade Journal**, **Commercial Car Journal** and **Chilton Automobile Directory** and other trade publications have devised a plan for the benefit of their advertisers that enhances and intensifies the value of every dollar spent in advertising automotive products.

Some time ago the Chilton Company observed that many advertisements in general mediums or trade papers aroused the interest of trade buyers but did not cause them to buy the products advertised. An investigation was made to determine the reason why so many potential sales were lost. It was found that the advertising seldom contained **definite buying information** that would enable buyers to order immediately.

Most advertisements stated that detailed information would be sent on request. In many cases men in the trade were too busy to write or did not care to do so. Many mechanics whose purchases were enormous in the aggregate disliked to write. Many dealers procrastinated until the desire to buy was forgotten. In this way advertisers lost many sales that would have been consummated had buying information been placed in the advertisements.

The natural solution to this condition was to advise manufacturers to place all necessary buying data in every advertisement. This, however, would entail the use of larger space often beyond the manufacturer's means or the reduction of space usually devoted to illustration and a statement of the product's advantages.

It was decided that this sacrifice of the attention-compelling value of advertisements should not be advised. Furthermore, while buyers demand specific information, the absence of attention-drawing and interest-creating copy would militate against the success of the merely informative announcement in a general or trade publication.

This was the problem. How was it possible to supply trade buyers who read advertisements in general and trade papers with detailed buying information at the time this information was needed, without materially detracting from the attractiveness and the pulling power of the advertisements? How the Chilton Company solved this problem is of interest to every advertising man. The Chilton Company publishes the **Chilton Automobile Directory**, which is distributed to every known manufacturer, jobber, dealer, garage and repair shop in the automotive industry.

The Chilton Plan is to have placed the detailed buying information about an advertised product in this reference book of the trade, where it is immediately available to every buyer, and to inform the trade that it is there. In this way one permanent catalog can be placed in one publication where it can be referred to in-

stantly, and each general and trade advertisement can tell interested buyers where full information may be obtained quickly and conveniently.

In order that all advertisers placing complete catalogs in the **Chilton Automobile Directory** might refer buyers to this information in a similar way, a Symbol was designed for advertisers to place in their other advertising.

This Symbol consists of a pair of wings that represent the automobile industry; a circle which indicates the concentrated buying power of the trade, and a wedge, driven deep in the circle, the force of catalog advertising.

It was proposed to manufacturers that they include this Symbol in all their advertising to indicate to buyers that they have placed complete buying information about their lines in the **Chilton Automobile Directory**.

The Chilton Company offered to furnish catalog advertisers in the **Chilton Automobile Directory** with electrotypes for use in general mediums, trade papers and direct-mail literature.

Making the Symbol Known

The value to be derived by advertisers from the use of the Symbol necessarily depends on how thoroughly the trade is acquainted with its meaning. Realizing this, the Chilton Company appropriated \$50,000 for the purpose of popularizing the Symbol throughout the industry.

The campaign, which has begun, includes the use of color inserts and page advertisements in all Chilton Publications for a year and page advertisements for the same period in the other leading publications in the field, and frequent insertions in **Printers' Ink**. These advertisements will carry the message with great frequency to all buyers in the trade, making them familiar with the appearance of the Symbol and its meaning.

Booklets, circulars and printed matter are being sent to the trade at frequent intervals to keep alive the impression made by the advertising.

In addition to this, the entire traveling circulation force explains the meaning and use of the Symbol personally to every man in the business. These circulation men tell the men in the trade how the Symbol helps them in buying.

Manufacturers who place catalogs in the **Chilton Automobile Directory** and use the Symbol in other advertising share in the results from the extensive campaign undertaken by the Chilton Company to popularize this Symbol to the automotive industry.

Its insertion in any advertisement tells trade buyers where complete buying information can be instantly found and eliminates the useless correspondence that occurred in the past between manufacturer and buyer.

Advertisers must place detailed, specific information of a catalog nature in the standard trade reference book or they cannot use the Symbol. Such copy consists of illustrations of the product or line, detailed descriptions beneath the products, prices if possible, and a list of distributors or service stations. To complete a sale it is essential to tell buyers **where** as well as **what** to buy.

Catalog Copy Needed

As the trade will be educated to understand that this Symbol used in an advertisement means that detailed purchasing information has been placed in the current issue of the **Chilton Automobile Directory**, it is necessary that every user of the Symbol place real catalogue copy, as described in the foregoing, in the Directory or the Symbol is not helpful to the trade. Therefore, the Chilton Company censors the type of copy that advertisers who desire to use the Symbol propose to place in the **Chilton Automobile Directory**.

Buyers instinctively accord preference to those makers who save their time and trouble by giving explicit information of the character they want.

Many automotive advertisers have enthusiastically expressed a desire to use the Chilton Symbol in their advertising. They declare it to be a most efficient tie-up of all their advertising efforts. They see how it correlates and co-ordinates all their advertising, referring buyers to a pivot point, i. e.: the complete buying data contained in the composite catalog of the trade.

They see in the Symbol a merchandising idea with great possibilities and they are availing themselves of the heavy expenditures being made by the Chilton Company, by placing the Symbol in their advertising.

As a result of the campaign the **Chilton Automobile Directory** will become such a composite catalog of the automotive industry that it will be almost impossible for a buyer to refer to it without finding the information he seeks.

Finally, advertisers who place a catalog in the **Chilton Automobile Directory** and the Chilton Symbol in all their other advertising, prevent the loss of sales that occurred in the past because complete information was lacking when the buyer wanted it.

The Chilton Symbol makes advertising to the automotive trade as nearly wasteless and scientific as it can be made. It enables advertisers to convert trade interest into sales, because it supplies potential buyers with purchasing information when it is needed. It makes buying easy and when you make it easy for a buyer to purchase, results always follow.

It is, undoubtedly, what so many advertisers have termed it "the missing link between publicity and results."

A. E. A. Show Presages Future Trade Activities

IF pessimism accompanied the tradesmen to the show it was not in evidence when they returned to their places of business. It must have died or wandered away and become lost during the interim. Visitors at the Automotive Equipment Association Show in Chicago the week of November 15-20 absorbed a general feeling of confidence as to the future well being of the Automotive industry, especially the equipment and accessory end of it, when they glanced over the 200 exhibits, the busy activity of the exhibitors, and the huge crowds representative of both the wholesale and retail trade.

Although buying on an extensive scale was rather slack during the early part of the week, reports from the majority of the exhibitors indicated that the amount of buying was very satisfactory and that the order book was used quite frequently during the closing days of the show. In view of these significant reports there

certainly is no reason to doubt the success of the show.

Sales promotion work, which is just as important, if not more so, than the actual business done at the show, did much toward the extension of acquaintances, the cultivation of firmer friendships, the establishing of good will and the bringing together of old customers and friends, opening to them an opportunity to, possibly, spread the salve and straighten out little difficulties that otherwise would never be settled or perhaps could never be settled through the cold print of correspondence.

Even if the show did not live up to the most sanguine of expectations as to the amount of business done, the fact that the exhibitors saw and sold more to their customers at the show than they could visit and sell in months, and at vastly less expense, marks the show as a decided success, despite the fact that last year's selling record was a little greater.

It is interesting to know that the Association has already closed a contract for the Coliseum for a full week in November next year, so that the third annual equipment show is already assured for 1921.

In consideration of the general business depression, the introduction of many new appliances at the show elicited not a little comment. It is a significant indication, that the general situation, through which we, at present, are undergoing, does not only impress manufacturers as being something of a transient nature, but also that the secession of buying will shortly be replaced by extensive buying. This is really an anticipation of a resumption of normal retail buying.

Of these new devices those that are applicable accessories and fittings for the commercial car, and new equipment and tools for the service station and repair shop, are described in the following pages.

Storm Vertical Power Boring Mill

The Storm vertical power boring mill was built by the Storm Mfg. Co., 406 Sixth Ave., S., Minneapolis, Minn., to meet the demand for such a mill that will turn out fast work and accurately rebore cylinders.

It has a pedestal body that is rigid and occupies a floor space, 30 x 36 in. and is 44 in. high. The bed is horizontal and adjustable overhead clamps facilitate the mounting of work.

The upper and lower adjustable main bearings supporting the centered boring bar are extremely liberal, being 8½ and 6 in. long, respectively. They are an in-

tegral part of the one-piece body casting. The 2 9-16 in. chrome nickel steel hollow boring bar is heat-treated, hardened and ground to size.

Two boring bar feeds are obtainable; 40 rev. per in. for general work and 80 rev. per in. for fast work. The boring bar is actuated by a heavy feed screw and out gears and has an upward travel of over 20 in. An automatic time-saving feature makes it possible to set the bar to stop and return to bottom at completion of the cut. Four self-centering multiple cutter adjustable type cutter heads are furnished, affording a diametrical boring range of from 2½ in. to 7½ in. Special heads to 12 in. diam. can be had. The shipping weight is 1200 lb.

Indiana Truck Lamp

The No. 11-G, heavy duty gas lamp for trucks put out by the Indiana Lamp Co., Connersville, Ind., has been designed to withstand vibration and is equipped with a 6-in. mangan mirror. The mirror is held by a steel shell.

A similar construction retains the lens in the door. The door is 10 in. in diam., opening in door 7½ in. and lens 8¾ in. The lamp is finished in black and the price \$17 per pair. It is made in the electric model known as the 11-E with single or double bulbs; price \$16.



Indiana Lamp for Trucks

Acetylene Generator Introduced

The Imperial automatic acetylene generator for use with welding, cutting or lead burning apparatus was introduced at the show by the Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago.

The following features are claimed for this generator: Low cost at which gas can be produced, the simplicity of the device, the carbide feed and the uniformity at which the pressure can be maintained. Both the feeding and the pressure regulations are automatic. Other features are the safety levers, which are foolproof, the safety blow-off, preventing over 5 lb. pressure and the gas purifier which cools the gas and prevents a back flash reaching the generator. This outfit can be had mounted on a three-wheel truck with complete equipment.



Imperial Automatic Acetylene Generator for Use With Any Make of Welding, Cutting or Lead-Burning Apparatus.

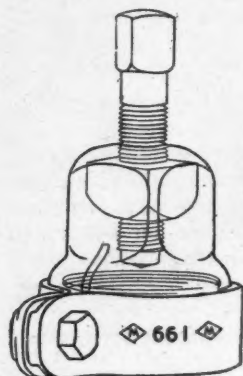


Storm Vertical Power Boring Mill for Boring or Reboring Cylinders, Bushings, Gears, Etc.

Mossberg Products

At the exhibit of the Frank Mossberg Co., Attleboro, Mass., several new items were observed. Among them were the No. 48 Mossberg heavy duty socket wrench set, Model D salesman of demountable rim wrenches, No. 661 wheel puller for Ford ton trucks and the socket chest No. 300, assortment of sockets and tools for dealers.

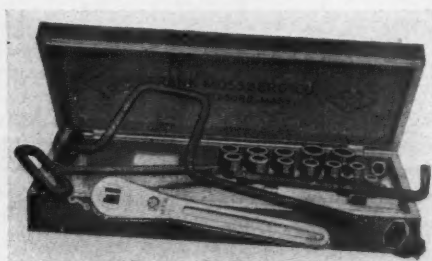
Mossberg Socket Wrench Set: A heavy duty reversible ratchet, nickel-plated, is furnished along the same lines as the smaller Mossberg ratchet handle. A brace handle is furnished, fitting all



Mossberg Truck Wheel Puller. It is known as No. 661.

sizes of heavy duty sockets, giving 15 sizes of speed socket wrenches. A "T" and an offset handle that also fit these sockets are included in the set. All these items are finished in rust-proofed black, with the exception of the nickel-plated ratchet handle.

No. 661 Wheel Puller: This wheel puller is designed exclusively for Ford trucks. The entire thrust on the bolt is



Mossberg Heavy-Duty Set

This is the No. 48 set of sockets. It includes the new heavy-duty ratchet, brace, T-handle and sockets

free, this being made in three parts, the shell, bolt and nut. When the bolt is screwed down it can be hammered without danger of stripping the threads, since the nut will move inward with the bolt when hit. It is made of drawn steel, finish rust-proofed black; price, \$1.56.

Screw Plate, Bushing Remover and Reamer Set

The Conant & Donelson, Conway, Mass., exhibit included a new Reamer set, a new Screw plate outfit, a Bushing remover and a Bit brace attachment for 2-in. diam. caps for rethreading a bolt, where an ordinary tap handle will not reach.

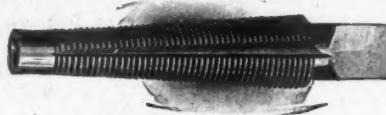
Screw Plate No. 3500: This outfit consists of separate sizes of U. S. Stand-



Reliable No. 3500 Combination Screw Plate

ard threads, seven sizes of S. A. E. Standard threads, U. S. Standard taper taps, S. A. E. Standard plug taps, one stock 15 in. long, another 23 in. long, one tap wrench 15 in. long and a bit brace attachment, dies 1/4 to 1/2 in., inclusive for 2-in. diam. collets, and 5/8 to 3/4 in., inclusive, for 2 3/4-in. diam. collets.

The Bit Brace Attachment is a device included with the Screw Plate and is a new item in the Reliable line. It permits



Reliable Bushing Remover

operating a bolt with ordinary brace where a tap wrench will not reach or will not operate. The price is \$.50 when sold separately.

Bushing Remover: It is handy for use in removing worn bronze bushings when it becomes necessary to replace them. It is screwed into the bushings



Reliable Ford Reamer Set No. R-12

tightly and driven from the far end with a hammer which will start the bushing out. This item lists at \$3.

Ford Reamer Set: The R-12 set, illustrated herewith, consists of 12 reamers most frequently used in garages and repair shops and cover 19 bushings on the car. The price is \$45.

Norlund Ten-Ton Jack

A new 10-ton jack with an adjustable step lift was exhibited at the Congress Hotel by the Norlund Novelty Co., Williamsport, Pa. The feature is the adjustable step, the extension handle control with a screw speed brace. The step fits in a notched track in back of the lift bar. It can be raised or lowered easily and independently of the screw lift. The worm wheel and pinion work on the rack similar to small Norlund jacks. This model has a total lift of over 12 in. All gears are of steel.

Continental Auto Parts Exhibit

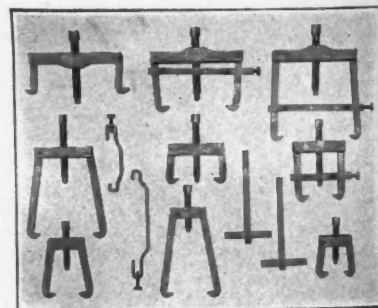
Several new items were shown at the booth given over to the products of the Continental Auto Parts Co., Columbus, O. Among others were the parts tray, piston aligning device and the small gear puller.

Piston Aligning Device: This device is employed for aligning up the pistons and rods, thereby reducing the danger of damage to the cylinders, rings, etc., by their being out of line. The connecting rod bearing is clamped around the



Continental Parts and Tool Tray

correct size of bushing, which is placed on the standard size arbor of the machine. Then the movable disk is moved against the piston and clamped, by swinging the piston and rod, the alignment of the lower rod bearing can be determined. The bushing pins in the arbor eliminate the danger of squaring the lower bearing. The disk is 16 in. diam. and is at right angles to the arbor.



Continental Gear Puller

This set is made of cold-drawn steel and is designed to facilitate removals in tight places

Briefly, this device tests the lower connecting rod bearings out of alignment, the upper connecting rod bearing worn out of alignment, bent connecting rods, piston pin holes out of alignment, piston pin bushings out of alignment and reamed holes of the piston out of true.

Parts Tray: This tray has a movable lower pan so that the height can be adjusted. It is mounted on double wheel casters. It is a convenience to those working on lathe, miller, shaper, etc., or when overhauling an engine. The top is solid metal. The length 32 in., width 18 in., height 32 in., weight 187 lb.

Continental Gear Puller: It is light and compact, consists of a complete set of large, medium and small size arms.



Continental Piston Aligning Device

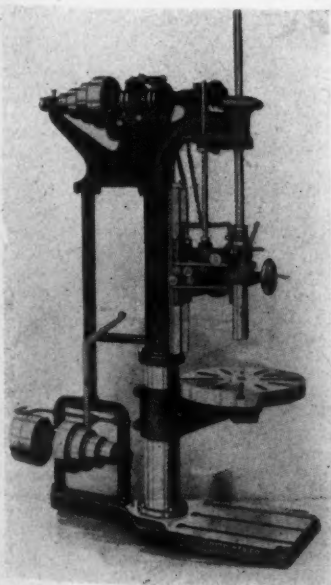
The large and medium sizes have a positive clamping device preventing the jaws from slipping off. The parts of this puller set are interchangeable and the jaws can be reversed or the screw reversed.

Canedy-Otto Shop Equipment

Two new items of the Canedy-Otto Mfg. Co., Chicago Heights, Ill., line were introduced at the show. One of these was a 25-in. Sliding head drilling machine, and the other the Canedy-Otto Jr. motor stand.

The drilling machine is of the latest type. The sliding head is well counter-balanced, can be moved up and down by a rack and pinion. The feed gears are in the sliding head, working in oil, and changes of feed are obtained by two levers. An extra tapping attachment can be had, if desired. The gears are steel heat-treated and enclosed and the bearings are phosphorous bronze. The revolvable table is heavily ribbed, adjusts vertically and swings to either side. This machine is particularly adaptable for re-boring cylinders and will handle the largest of cylinder blocks.

The Canedy-Otto Jr. motor stand is for Ford and Chevrolet motors and pro-



New Twenty-Five Inch Canedy-Otto Drilling Machine

vides extreme accessibility to the respective unit power plants. It is so constructed that all valves of the cylinder blocks are easily accessible and the unit power plant can be revolved to any angle. The engine is retained by a special yoke and spindles securely fastened by nut and washer.

Simplicity Repair Shop Equipment

Among the items exhibited by the Simplicity Products Mfg. Co., Milwaukee, Wis., at the Congress Hotel, were several new and interesting products. These were the Simplicity garage jack, Simplicity ambulance, Simplicity hydraulic jack and the towing pole.

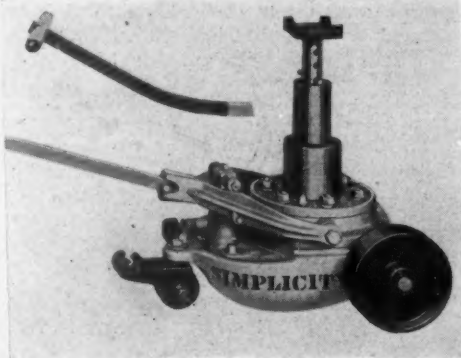
Simplicity Garage Jack: This is a device valuable about the garage, tire,



Simplicity Garage Jack

wash rack and repair shops. It is simply constructed and has three adjustments for height. Its capacity is 3000 lb.; length, 68 in., and weight 30 lb. The frame and wheels are made of semi-steel and the handle of steel.

Hydraulic Jack: This jack has a capacity up to 12 tons. A swivel wheel permits its turning in its own base. The jack stands 8 in. high and requires 17 x 21 in. floor space. The handle is re-

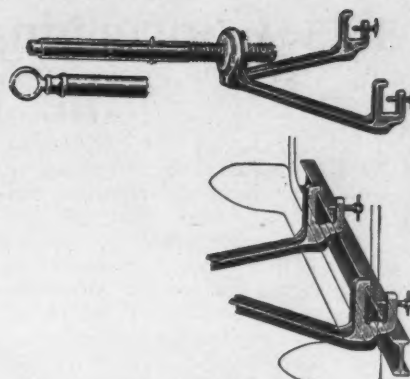


Simplicity Hydraulic Jack

This unique Jack is mounted on three wheels, and has a lift of 8 in. and an adjustment of 3 in., and a range of adjustment from 8 to 19½ in.

movable and is used as the operating lever and also for moving the jack around. The range of adjustment is 8 to 19½ in., wheel diam., 7 in.; swiveled wheel, 4 in.; face of wheel, 12 in. The base of the jack is 12 x 16 in., material steel and semi-steel, weight 160 lb.

Towing Pole: This pole, which is 8 ft. long, has two coil compression springs, one to absorb the starting and the other to absorb the stopping strain. A ring ball and socket joint allows flexibility in turning corners. The clamps for attaching to the car axle are fastened at two points and are retained there by heavy screws with lock nuts.



Simplicity Towing Pole

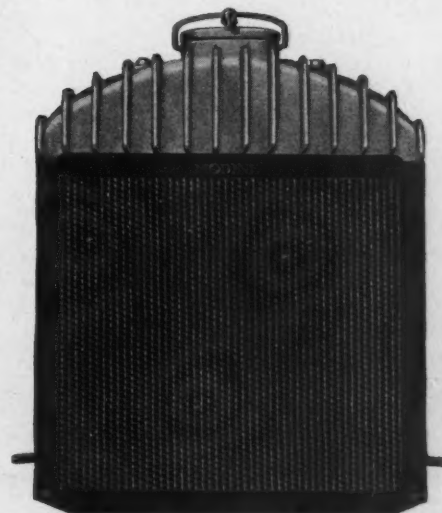
Arrow Grip Products

An interesting exposition of Arrow Grip products was put on at the show by the Arrow Grip Mfg. Co., Glens Falls, N. Y. A new item was presented, a jack in two models. This latest jack is known as No. 301 and 302 of 4000 and 6000 lb. capacity, respectively, and listed at \$8.50 and \$12.50. This jack is similar to the roller base jack brought out recently by this company, except that the roller feature is not incorporated.

A complete line of the non-skid outfits for solid motor-tired vehicles in various models and types was also exhibited.

Spirex Radiator for Ford Truck

A new radiator with a demountable core construction has been added to the Spirex line, Modine Mfg. Co., Racine, Wis. This was exhibited at the Show and it was featured by the demountable core. The entire core can be removed as an independent unit by taking out four bolts without interference from the head, frame or water connection. The head is cast iron and the vertical ribs are large with plenty of water capacity. They are supported by side columns of heavy gage pressed steel.



Spirex Truck Radiator for Ford Trucks

A Spirex core is used in this radiator, it being an independent unit and secured to the head by two bolts and to the sides near the base.

Facts Concerning the Conditions and Problems of the Bus Business of Today

THE omnibus and its relation to inter-city and inter-urban traffic is a matter that has resulted in much planning, activity and success both in profits and community service during the last decade. Motor bus lines have been established where no inter-urban railway service is provided. Buses have also taken up inter-city traffic where inter-urban lines leave off, transporting passengers into regions not touched by these lines.

They render an important service in the West where the railroads do not have as many branch lines as in the East and the more thickly populated sections of the country, especially in runs between many of the railroad towns and the towns located many miles from the railroads. These Western bus lines, when operated by reliable companies employing intelligent drivers, also make themselves valuable to isolated communities by carrying the mail and express.

Another factor in favor of motor buses is the fact that they reduce accidents as well as congestion where used in the large cities. They load and unload at the curb instead of in the streets, making it unnecessary for people to run in front of the motor traffic of the street.

But there still is much to be done in the line of efficient bus operation, both insofar as an accurate cost system and strict running schedule are concerned. The following is devoted to the cost system end of it. Of course, there are lines operating over various sections throughout the country that are being run on a firm business-like principle, but they are in a large minority.

Most operators seem to be satisfied to run their bus or bus lines on the "pay as you go" attitude with a total disregard of the expense of tomorrow. Some are under the impression that rough estimates or a generalization of operating costs are sufficient to carry them along and keep them on the right side of the profits and loss margin. It appears, in view of the many failures incident to this inefficiency, and the frequent announcements in the various organs of the industry, pointing out these failures to emphasize and illustrate the absolute need of system, that many of those interested in motor bus operation prefer to learn of their inefficiency through experience rather than be educated through the failure of others. That operators persist in ignoring what should be apparent, we know; but why? It must be shiftlessness, carelessness, or rank laziness. Ignorance is inexcusable.

Establish the cost system habit and prosper. The result is inevitable. Correct business ethics has proved it so.

Summarize your yearly expenditures which include repairs, up-keep, fuel and lubricant consumption, overhead, your interest on the original investment, depreciation and insurance.

So much for those who are engaged in the bus business.

What are the potential possibilities of bus operation? Is the value of the bus to a community established and is it recognized by the populace? Is not its range of service limited to small, and in most instances, an already covered field? Why do we hear of motor line difficulties and some failures for both individual and or-

ganized enterprises? What chassis construction is most adaptable to the requirements of bus service? Has development brought about any standardization in body design? What is considered the most satisfactory? How are schedules maintained?

Questions and inquiries such as these, which are continually being asked, are known and, therefore, simple to the majority of those directly associated with the subject of buses, but when considering the vast possibilities of this field, as compared with the small number of persons fully conversant on the matter of motor bus transportation, insight into the above outlined questions will result in a fund of valuable information, especially for the dealer. The following pages are particularly for the attention of information seekers along this line, and also for manufacturers and dealers desiring not only to enlarge their versatility, but to perhaps discover something that will lead to still further improvement in bus design and service.

The descriptions, illustrations and resumes of the various types of buses on the market will aid dealers and operators in comparing the various makes and their qualifications and will thus present a general prospectus of the equipment available. It is up to the dealer to see that his motor truck sales to bus operators promote satisfaction and repeat orders by his knowledge and understanding of, and ability to provide his trucks with suitable body equipment for, the needs of the motor bus lines on which they are to be used.

Bus Operation From an Owner's Angle

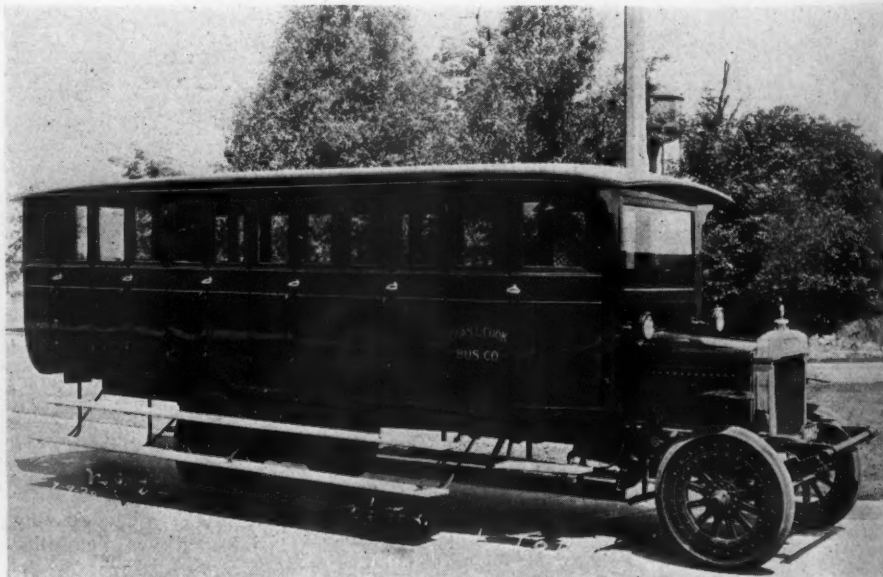
Charles L. Cook, of the Charles L. Cook Bus Co., Milwaukee, Wis., declares that operating a sight-seeing car bus is a profitable business, if run properly. And, as all profitable business enterprises will sooner or later develop competition, it is necessary to secure something which your competitor has not, or which he has not had sufficient time to establish—a reputation for service. This requires attention to small as well as large things. Among other essentials a dependable chassis and an attractive and comfortable body go a long way toward the acquisition of that all-important controller of success—service rep.

Mr. Cook relates in the following lines his experience in connection with an attractive body and profits as he found them in the bus business:

"On July 1, 1920, I purchased a 2½-ton Atterbury chassis with a long wheel base. I had my own ideas as to what kind of a body a sight-seeing bus should have, so I designed a body myself, and had it OK'd by the Atterbury people before I had it built. It is attractively finished in dark

green, and upholstered in brown leather. It has the appearance of a big private limousine, and is just as comfortable.

"The chassis is equipped with solid tires, singles on the front and duals on the rear. I use cushion wheels to give greater



An Attractive and Comfortable Body, Mr. Cook Asserts, Transcends Any Other Qualification Toward the Acquisition of Business

life to the truck and more comfort to the passengers. The truck is equipped with a speedometer, and a governor set at 15 miles per hour.

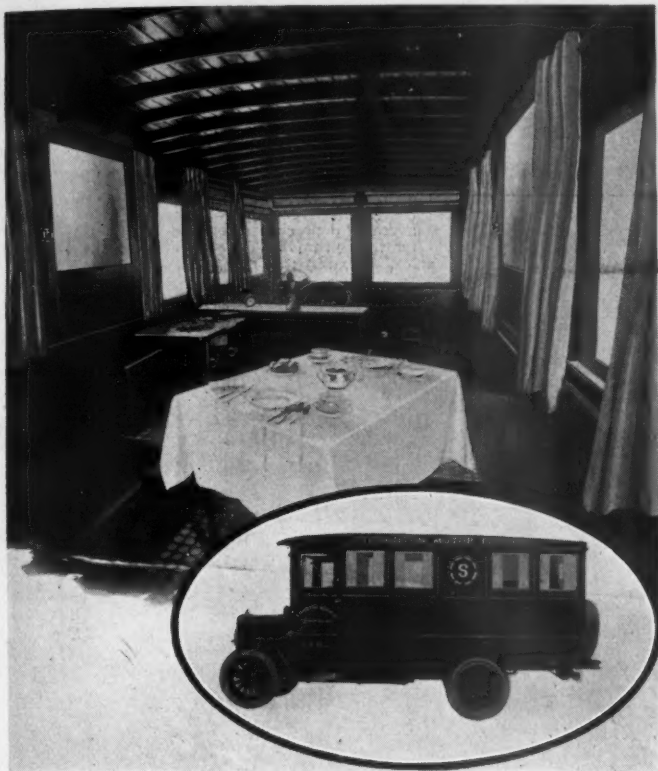
"Every afternoon, including Sunday, the bus meets the Goodrich boat when it comes in from Chicago. This lake trip is very popular, and the boat usually brings a good load. Shortly after the boat is docked, my bus is loaded to capacity. As my price is the same as that of my competitors, people naturally prefer to ride in my bus because my Atterbury is the most

attractive looking sight-seeing bus in Milwaukee.

"My bus is always loaded and on its way long before any of the other buses are half full. This reduction in loading time increases my profits, because it enables me to make more trips per day than my competitors can make. It takes a little over an hour for the bus to cover the sights of Milwaukee and return to its starting place, having traveled 16 or 17 miles. In addition to the passengers obtained from the steamboat, there are usu-

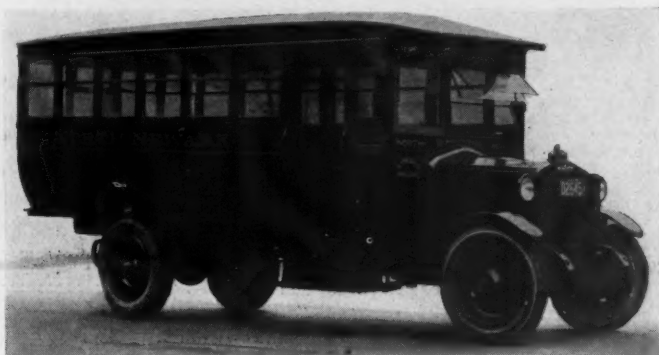
ally enough other visitors in Milwaukee to fill the bus for two more trips a day.

"I average a full load of 28 passengers. As each passenger pays \$1, the Atterbury takes in a total of \$28 a trip, or \$84 for the three trips made each day. The sight-seeing bus business in Milwaukee is good for about five months in the year, making my total income \$12,600. If I lay the truck up during the winter, the annual cost of operation would be \$4,273.96, which would make my net profit \$8,326.04 for only five months' work.



Wheeled Residence Employed by a Sales Representative in Covering Territory

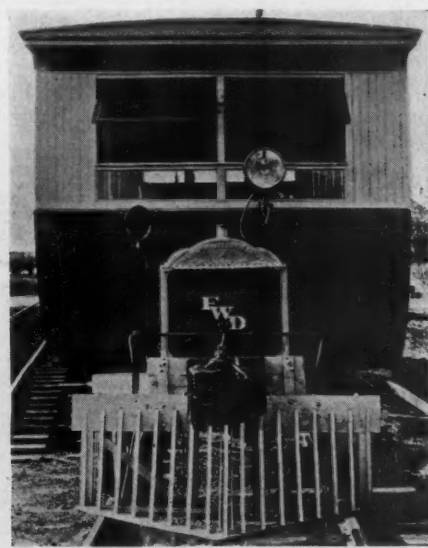
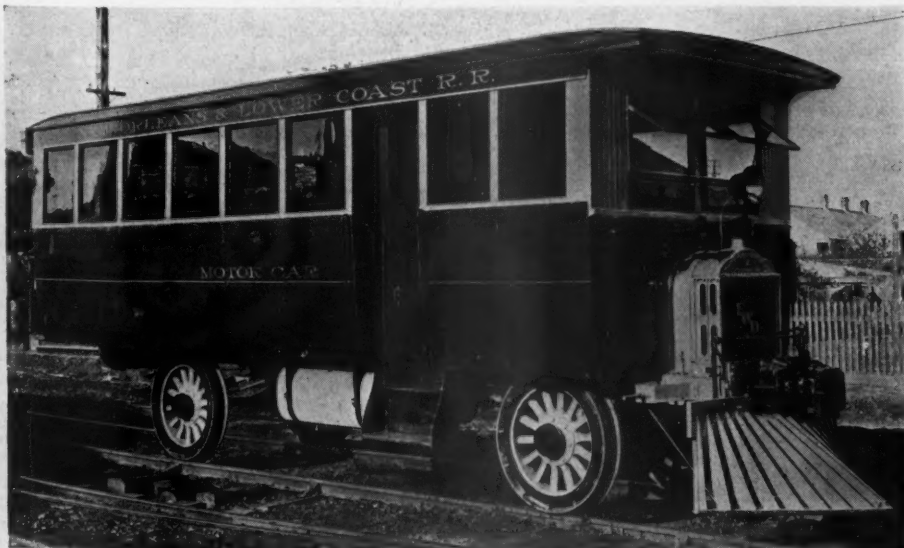
Mr. Dustman, southeastern sales representative of the Stoughton Wagon Co., Stoughton, Wis., and his wife travel in this "home on wheels" through the eight states embraced in his territory. In it they enjoy all the comforts of a snug little apartment. The body, a special job, is mounted on a Stoughton 1½-ton truck chassis.



Bus Body Typical of Those That Have Been Mounted on Northway Trucks During the Past Year

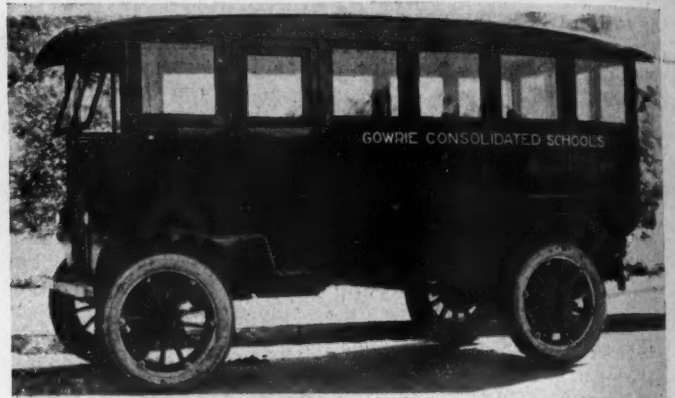


One of the Two Commerce Buses in the Employ of the Woodville, Ohio, Public School for the Transportation of Children



Two Views, Showing the Special Outfit Used on a Railroad Motor Bus Line Recently Established by the New Orleans and Lower Coast Railroad

This special passenger bus, mounted on a standard FWD truck chassis has a seating capacity for thirty-two persons. Entrance is through a side folding door at the forward end. Power for the four dome lights, headlights and rear marker lights is furnished by a 24-volt, single-unit system. By means of a take-off, the exhaust gases from the engine are diverted from their course through a series of pipes that radiate heat into the interior of the body.



Two Views of a Line of Kratzer Bus Bodies Built for Mounting on Any Standard Truck Chassis for Any Service
At the left is shown a 10-ft. body mounted on a Ford one-ton chassis. The right-hand view shows a 14-ft. body mounted on a 1 1/4-ton Samson truck. A feature of those school buses of this line, that have the entrance door at the rear, is a special door control or safety device which simultaneously opens the rear door and unfolds the step. When the door closes the step folds up out of the way. No one can hang on behind. This feature helps to avoid accidents. This line is offered by the Kratzer Carriage Co., Des Moines, Iowa.

Bus Operating Costs

The following figures show the actual cost of operating two entirely unrelated jitney bus lines. These figures were received direct from the owners and operators. They represent a recapitulation for an entire year taken from records maintained by the operator for each running day of that year.

Cost of Operation

For Reo Jitney Bus

Yearly run estimated 30,000 miles. Fifteen trips per day, (340 days).

Cost Per Year

Gasoline—10 mi. per gal. @ 26c	\$709.02
Oil—600 mi. per gal. @ 50c	25.00
Tires—3 1/2 sets @ \$223.30	837.38
Repairs	300.00
Insurance	71.50
Depreciation (4-year basis)	500.00
Interest	120.00
Garage	120.00

\$2,682.90

Returns

15 rounds trips per day	
360 passengers per day @ 5c	
340 days per year @ \$18 per day	\$6,120.00
Deduct cost of operation	2,682.90

Net profit on original investment of
\$2,165.00

\$3,437.10

Weekly Basis

Running 6 1/2 days @ \$18 ... Gross receipts,	\$117.00
Cost per week @ \$7.89 per day	51.29

Net profit,

\$65.71

Payment on bus,

30.00

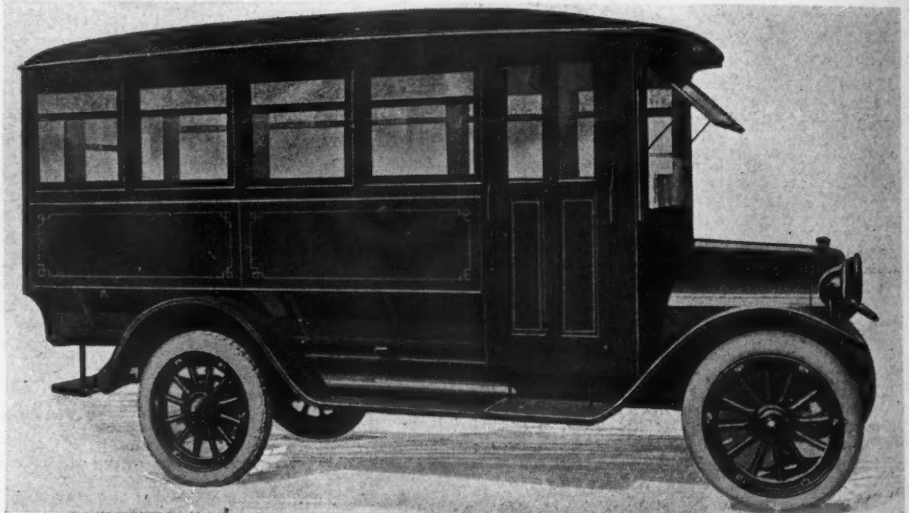
Balance,

\$35.71

Figures, showing cost of Reo jitney bus for one year; based on 300 actual days' running, or 45,000 miles total.

New Reo jitney, complete, including transportation and War Tax	\$2,050.00
For changing tires to 35 x 5 Royal Cords on 4 wheels	96.00
For re-inforcing 2 rear and 1 right front spring	25.00
4 extra sets 35 x 5 Royal Cord tires	980.00
4500 gal. gasoline @ 22 1/2 c per gal.	1,012.50
450 qt. of cylinder oil @ 12 1/2 c per qt. ...	56.25
50 lb. grease @ 10c lb.	5.00
Insurance, valued policy \$1,500—fire, theft and \$100 deductable collision	97.25
Repairs, including overhaul	300.00
Interest on original investment	125.00
	\$4,747.00

Less market value of bus at end of year—based on percentage of original cost—average depreciation on Reo bus 50% for first year	\$1,025.00
Net cost operating for one year, not including Liability Bond and 5% of receipts paid to City	\$3,722.00
Estimated average receipts of Reo buses running on streets of Newark \$25.00 per day—300 days	\$7,500.00
Less 5% paid to City	375.00
	7,125.00
Less net cost of operating, etc.	3,722.00
Net profit,	\$3,403.00



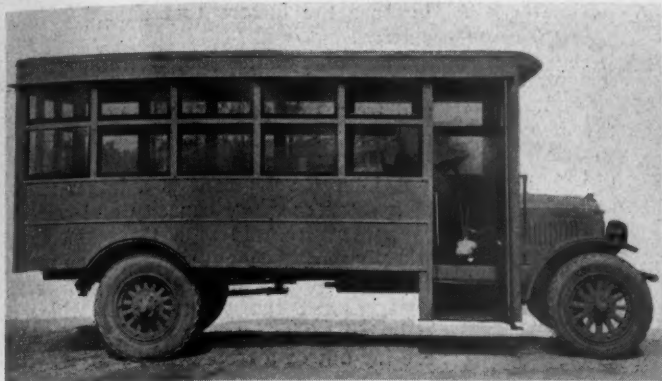
Sixteen-Passenger Bus Body for a Large Variety of Truck Chassis

This job, known as Model 500, is manufactured by the Springfield Commercial Body Co., Springfield, Mass. The front door is a "pay as you enter" type, and the rear is provided with a folding step. The windows are of the sliding type. Two dome lights, six push buttons and a buzzer comprise additional interior equipment. The overall length is 12 ft., 6 in.; outside width, 63 in.; inside width, 58 1/2 in.; and height, inside, 70 in.



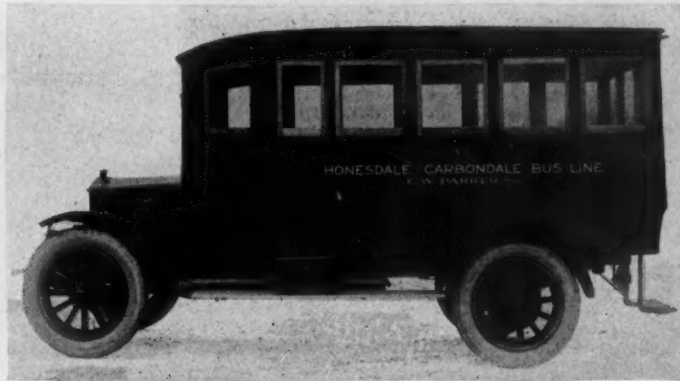
More Bus Bodies to be Shown in Next Issue

Due to insufficient space and because many illustrations and stories reached us too late for publication in this issue, this subject will be concluded in the January issue.



Armleder Bus Body Mounted on a Two and a Half Ton Armleder Chassis

It is in the service of the Canton-Akron Transportation Co., and is employed for passenger service between these two cities



Fifteen-Passenger Job Mounted on a Rainier One-Ton Chassis

It has been in operation between the towns of Carbondale and Honesdale for some time. The driver also acts as fare-taker



School Bus Mounted on a One and a Half Ton Dearborn Truck

This bus, which has supplanted three wagon teams and drivers formerly employed to cover three routes, travels thirty miles each school day and transports seventy-two children in a total of fifty minutes at a cost of \$3.80, which includes cost of driver. The former cost by wagons was \$9.00 per day. This bus is in the service of the Montgomery township, Indiana.

Cost Figures Illustrating Bus Operating Possibilities

A striking illustration of the profits that may be earned from the operation of a bus line is furnished in the experience of G. L. Cobb, who owns a bus line operating between Easton and Martin's Creek, Pa.

Mr. Cobb bought a special body $1\frac{1}{2}$ -ton Garford truck three years ago and has run it continually since then over the 16-mile round trip of his bus route. The truck has run on an average of 34,000 miles a year with a total repair cost of only \$30.

The Garford bus makes an average of five daily trips, carrying about twenty persons each way. The fare is based on the distance traveled—two miles, ten cents; three miles, fifteen cents; five miles, twenty cents; eight miles, twenty-five cents. Commutation tickets are issued to regular passengers.

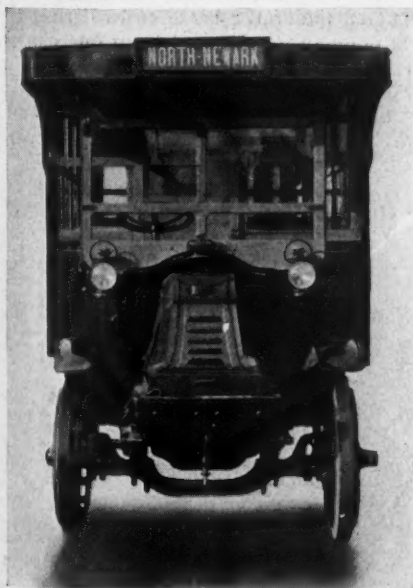
In addition to the snug profits realized from his passenger business, Mr. Cobb picks up extra money for freight hauls. The bus has a rear rack for the transportation of cans of ice cream, watermelons, trunks, hay, feed, shoes or any other small article of freight than anyone on the route wants hauled. This rack nets a nice weekly revenue.

The bus is chartered for special occasions, at which times a smaller bus is substituted on the regular route.

"For example," explained Mr. Cobb, "one day I pulled my bus off the route and took a crowd of thirty women into New York City for the day. The bus left Easton at 8.30 in the morning and made the 80-mile run by 1 p. m. The women had time for a shopping tour, a visit to the Hippodrome and were back home at 10.30 that night, delighted with the excursion and ready to do it again. That trip made me \$90. Another time I was paid \$50 by a wealthy Eastonian to take a crowd of children from an orphanage on a day's airing in the mountains."

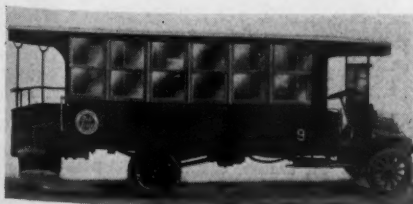
Residents along the route give their orders to the bus man or telephone their grocer, butcher or some other merchant to meet a certain bus with an order of meat, potatoes, watermelons or whatever they want. The orders are dropped off by the driver. This plan makes more trade for the Easton merchants and is a splendid accommodation to the patrons.

The freight rates depend upon the size, quantity and distance hauled. Ten cents



Three Views of a Geo. B. Marx, Brooklyn, N. Y., Specialty in Motor Buses

The seats of this twenty-passenger outfit are arranged crosswise with the aisle in the center. The finished product is completely equipped with all the essential units making for the convenience and comfort of passengers. Included in this equipment are: Two dome lights in the center, four stop buzz buttons, six electric light bulbs, and stop bell. The following are general dimensions: From rear of seat to end of body, 10 ft. 6 in.; rear platform, additional 3 ft. 2 in.; outside width of body, 7 ft. 2 in.; height inside of body, 6 ft. 4 in.; weight, about 2400 lb.





Special Body Employed on a Line Between Easton and Martin's Creek

is the lowest charge made and usually 75 cents is the highest. A big trunk will cost 75 cents, a small one 50. A five or ten gallon can of ice cream is 25 cents and a watermelon 10 cents. This business averages \$60 a week, all of which is clear profit.

In the three years this truck has been operating only \$30, it is said, has been spent for repairs. This record is remarkable, because the road traversed is macadam and is not in good condition. It is narrow and has become pitted in many places.

During the year ending August 1, 1920, the bus ran 340 days, making a total of 34,000 miles or 100 miles daily. On six days the smaller bus was used. The operating cost was \$17.47 per day, or 17.5 per mile. This included \$1,430 a year for a driver.

"To be on the safe side, I am allowing \$300 a year for maintenance and repair,"

said Mr. Cobb. "The truck is depreciated on an estimated life of 170,000 miles, of which 102,000 have been run.

"A further analysis of cost shows that if the bus averages 100 miles a day with ten passengers on each one-way trip and costs \$17.47 per day, the cost is 8.74 cents per passenger or .874 cents per passenger mile.

"Looking at it another way, the bus averages 20 passengers each way on its five trips, or two hundred passengers a day. If each passenger pays 15 cents fare, which is a conservative average, the bus is earning \$30 a day. In addition, there is the freight business of \$8 a day.

"On the New York trip with the thirty women the bus earned \$90. The operating cost for that day was \$24.48, because the distance was greater than usual and I had to allow for the driver's overtime. But the profit on the trip was a fraction over \$65."

Omnibus Chassis Designed for Bus Service

The Vreeland Motor Co., Newark, N. J., believing that the bus operator is dissatisfied with the heavy slow-going vehicle with its lack of prompt acceleration and the lighter models with its lack capacity, has introduced a special model, known as AJ of 1½ to 2 tons capacity, designed especially for bus service. In it particular regard has been paid to quick pick-up, speed, power, the elimination of vibration, and combining of truck sturdiness with large passenger car performance and ease of operation.

The speed of this model, which can be governed to meet local conditions, is claimed to operate at 40 m.p.h. with full load smoothly and without vibration. A 4½ x 5½ in. engine, which develops 48 hp. at 1000 r.p.m. provides the power. Quick pick-up and get away is said to be facilitated by the four speeds forward and one speed reverse transmission. And the worm-gear, semi-floating, two-ton rear axle, which has a final gear reduction of 6½ to 1, represents the last of those particular units that require special at-

tention for the construction of a truck chassis to be employed in bus service. Correct power combination is necessary for this work. The motor speed, the rear wheel diameter, and the rear axle gear ratio best adapted to meet the needs of a

bus are the factors that should be considered.

The home of this job, Newark, is a fertile hot-bed of motor bus development and from this point of vantage the company is carrying on a careful, detailed study of omnibus requirements.

A later development is a larger model of greater carrying capacity and comfort to passengers. It is a three-ton, long-wheelbase chassis and is known as model BL. All the seats are arranged cross-wise, except the driver's seat which is swiveled. The interior closely resembles the lay-out of a trolley car, with its electric lights and the arrangement of the window braces at the back of each of the seats. The opening and closing of the doors is controlled by a lever in easy reach of the driver, and the entrance step is low hung. A dual windshield provides a clear view arrangement for the driver. Other equipment includes an electric steering mechanism, and Kelly-Springfield cushion tires in rear and pneumatic tires in front.

Berbrewco Standardized School Bus

The Bergstrom-Brewster Co., Denver, Colo., is manufacturing a standardized school bus to fit practically all makes of trucks. The models, namely, A and B, are designed to accommodate of from 25 to 30 and of from 40 to 45 children, respectively. Following is a brief description of construction and specification.

The frame is of seasoned hardwood, either oak, maple or ash, and the side posts, which are bolted to the roof, and cross bolsters are reinforced with side irons where necessary. The side panels are made of three-ply Haskolite, but the rear panel is of steel, of curved design.

The wheel housings were designed with an eye on the need of ample clearance for giant pneumatics. They were also constructed under the seats as to permit the bus body to be changed from one chassis to another when necessary.

The full slatted roof is supported by hardwood rafters of the truss design and are spaced approximately 14 in. apart. Roof covered with neverleak material.

When lowered, the windows, which are of the drop type, project above the body



Side View of the Model BL, One Hundred and Seventy-Eight Inch Wheelbase, Ultimate Bus

The body length to end of frame is 19 ft., width is 7 ft., and the seating capacity is 30 passengers

rim about 8 in.; this prevents the children from leaning out when the truck is in motion. Model A has four windows to a side and Model B five; both have one window at the rear, and all are interchangeable. There are two seats along the sides, one center aisle seat extending the full length of the bus, and a cross seat in the rear. The cushions, which are large and comfortable, are of the box spring type and are constructed so that they can be removed if necessary.

The large windshield, which is of the rain vision type, is hung on automatic adjustable hinges. A large window on each side of the windshield gives the driver additional protection without impairing his view of the road at any time.

Entrance to the bus is made through a door which is on the right side, and the entrance step, which is hung low, is com-

Exterior View of the Berbrewco School Bus.

Note the windows, which project above the rim of the body, preventing the children from leaning out, and also the low entrance step.



pletely enclosed when the door is closed.

The job is well finished with paint and varnish both in the interior and exterior.

The average weight of Model A is 1400 lb. and Model B 1600 lb.

The extras that can be obtained with this bus are: 10-in. call-gong, large size Perfection heater, 5-gal. emergency gasoline tank, painting chassis any standard color, and lettering.



Open-Air Bus Used in the Streets of Bombay, India

Statement is made that it is being run quite successfully by the owner whose chief source of business results from accommodating commercial travelers from other countries



Open-Air Bus Employed by Golf Club

The distance between the club house and the grounds of the Harbor Point Golf Club was such that the addition of the above outfit, offered by the Higrade Motors Co., Harbor Springs, Mich., for transporting the golfers was found both a time saver and a convenience.



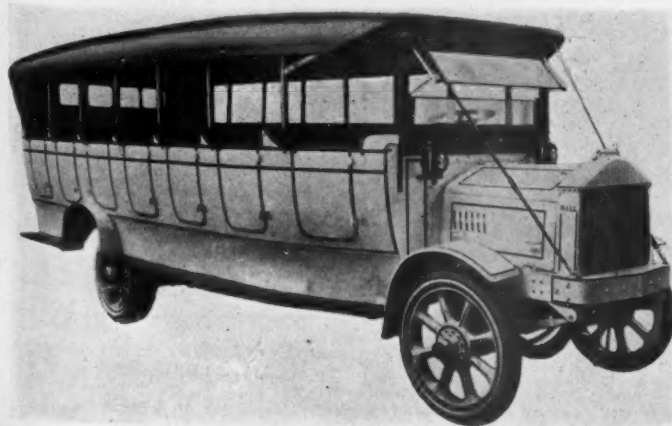
Type No. 1016, Popular Size of the 1000 Class

The 1000 class is the name given to the type of motor buses the E. M. Miller Co., Quincy, Ill., has been for some time standardizing on. This class includes various sizes seating from ten to eighteen persons comfortably. It measures 12 ft. from dash to inside of rear.



Large Passenger-Carrying Body of the Limousine Type

This body, built by the Hopkins Mfg. Co., Hanover, Pa., is 24 ft. long and is mounted on a Packard Model 4D truck. The interior is mahogany finished with silver-plated trimmings and silk draperies. Three of these funeral bodies are at present being operated in Detroit by M. H. Hungerford.



Forty - Two - Passenger Sight - Seeing Body Manufactured by Fitz Gibbon & Crisp, Inc., Trenton, New Jersey.

The roof cover of this job is made to roll on bows and is equipped with regular side or roller curtains.

Another Type of Motor Omnibus

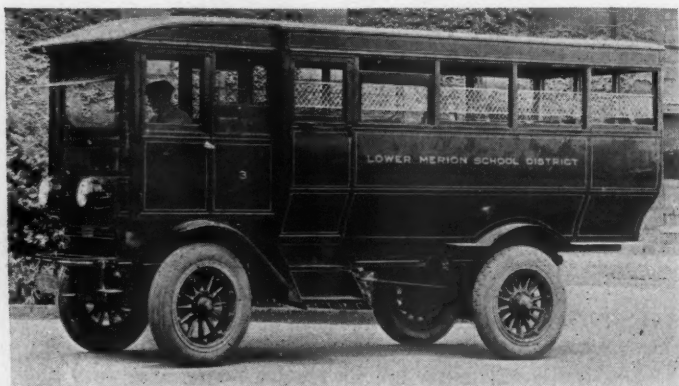
The special bus body shown herewith, which is mounted on a Day-Elder Chassis, is one of a fleet operated in the city of Providence, R. I., and neighboring states by the Luff Corporation.

This bus seats 24 passengers in comfortable side and end seats finished with rattan, and of the type of the seats in the cars on the Suburban lines to Warwick. There are electric lights in the roof of the bus, push buttons at each window section for signalling the driver, wide windows at all sides and in the rear, each window is guarded by bars to prevent injury to passengers.

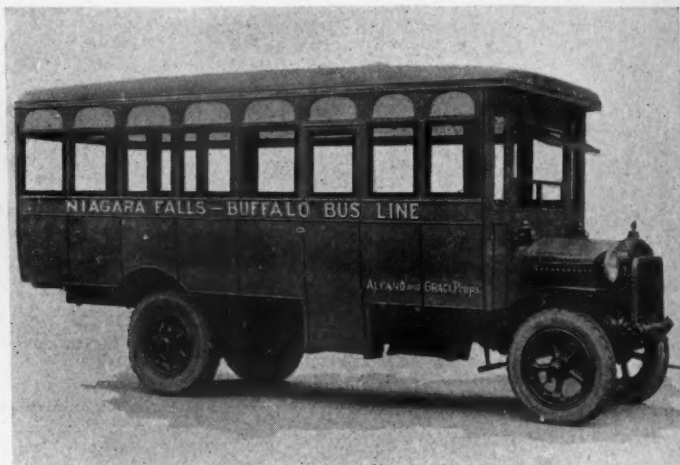
An emergency door at the front—this door of entrance being placed beside the driver's seat, so that each passenger in entering must pass the driver, thus making payment in advance, most convenient. The tire equipment is pneumatics, 35 x 5 in front, 38 x 7 in rear.

The bus rides very easily, the body is well balanced, the appearance is pleasing, and the bus has been found well adapted to the purpose for which it is intended.

A Number of These Bus Bodies Mounted on Day-Elder Chassis Are Used in Massachusetts Cities.



For Five Years the Lower Merion School District, Pennsylvania, Has Met With But One Minor Mishap Transporting Children by Bus. The Above is the Autocar Style.

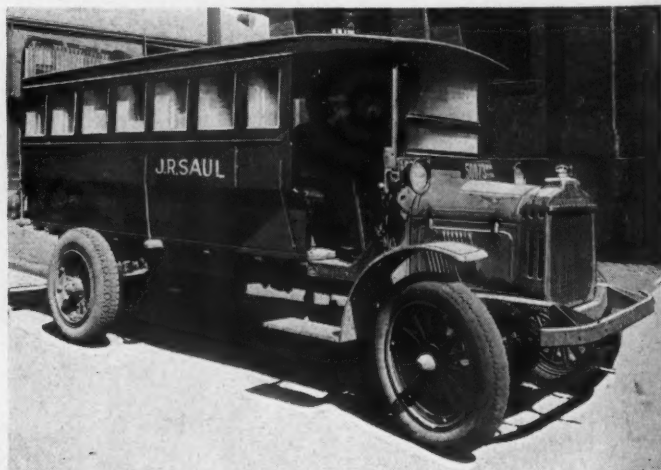


Thirty-Two-Passenger Bus Body on a Two and a Half Ton Selden Chassis

Entrance is through one door only. Three electric dome lights provide illumination. The frame and flooring is constructed of ash, and the inside dimensions are 18 ft. x 7 ft. x 6 ft.

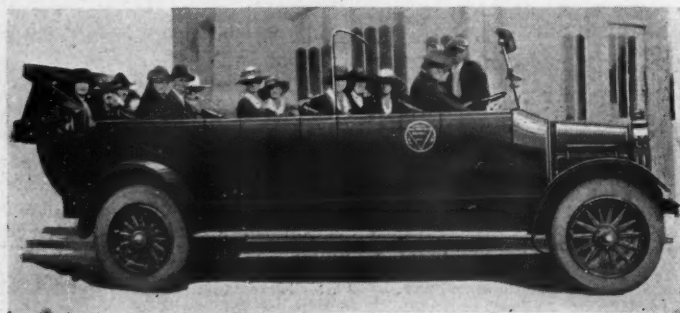


Showing One of the Autocar Buses in the Service of the Royal Blue Sight-Seeing Line Operating in Washington, D. C.



View of the U. S. Motor Bus Operated Between the Cities of Greenbrier and Huntington

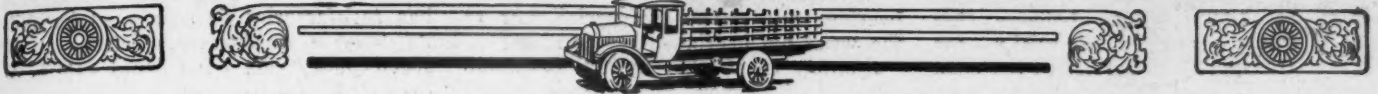
The bus is owned by J. R. Saul and it covers 150 miles a day, in fact, it is said to have given 30,000 miles on its original set of pneumatic cords



Bus With a Touring-Car Type of Body

The Broadway Transportation Co., Portland, Oregon, uses this type of bus for sight-seeing trips between Portland and Columbia River points, as well as other similar local localities. This is one of a fleet of four U. S. two-ton jobs, all of which operate on pneumatics.

NEW COMMERCIAL CARS



New Hurlburt Job is Assembled From Standard Units

STANDARDIZED materials are employed exclusively in the new 1½-ton Hurlburt job. The entire truck is so constructed as to afford general accessibility to all units without disturbing or being interfered with by other immediately adjoining parts. This feature has its advantage in service in that

reservoir and attached to the upper half of the crankcase to make it independent of the oil pan. Pistons and cylinders are oiled by the splash created by the lower end of the connecting rods.

Cooling fluid is circulated through the cooling system by a water pump. The radiator is of Hurlburt design and is of

Fuel is fed by gravity from a gasoline tank located under the seat to a 1½-in. Fletcher carburetor of the float feed type with a hot spot manifold.

From the engine power is carried through a Brown-Lipe multiple-disk, dry-plate clutch to a Brown-Lipe selective sliding-gear transmission which provides three speeds. The engine, clutch and transmission are mounted in unit. Leaving the gear set the power is transmitted through the propeller shaft equipped with Spicer universal joints to a ¾-floating, worm drive, Empire rear axle. The driving shafts of this axle are heat-treated, nickel steel. The worm and worm wheel mounted independently are removable from the rear of the housing without the use of a jack or without disturbing any other part.

The front axle is of the conventional "I" beam construction, and is of Savage make. It is a one-piece oversize forging without weld. Taper roller bearings are used.

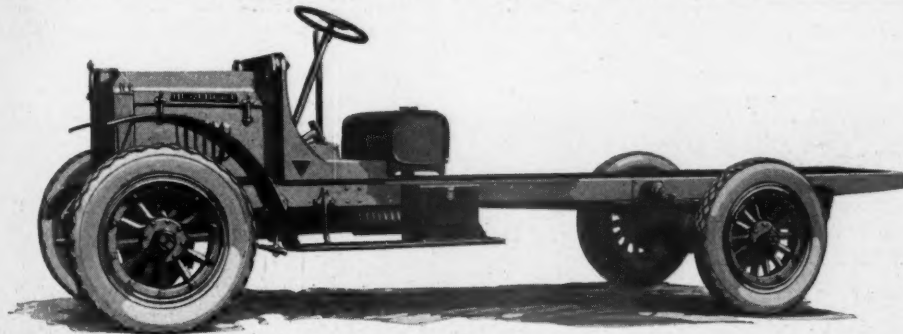
The brakes, which are external expanding for both the service and emergency are operated through a special Hurlburt equalizer. The brakes also have special friction facing.

The channel section, pressed-steel, hot-riveted Savage frame, the outer section of which is 5½ in. deep, is carried on four semi-elliptic springs. The rear springs take all the propulsion and torque of final drive.

The steering is through a Ross steering gear.

The wheelbase is 148 in.; overall length, 18 ft. 6¾ in.; width of frame, 34 in., and distance behind the driver's seat, 11 ft. 4½ in.

The wheels are equipped with 34 x 4 in. single solids in the front and 34 x 5 in. dual solids in the rear.



New Pneumatic-Equipped One and a Half Ton Hurlburt

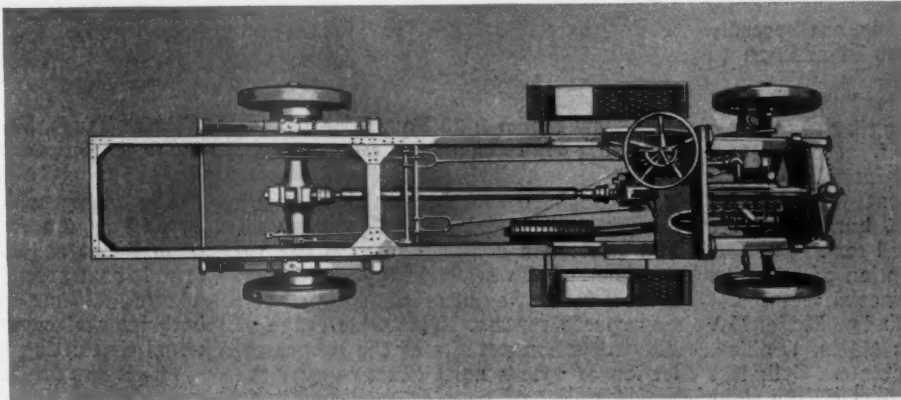
the time ordinarily consumed in getting at the point to be repaired has been materially reduced. More time can, therefore, be extended to actual work on the defective part or unit to be replaced.

The manufacturer, the Harrisburg Mfg. & Boiler Co., Harrisburg, Pa., asserts that as the power is transmitted in a straight line, not only is much vibration, back-lash and loss of power eliminated, but combined with the chassis spring suspension easy and comfortable riding is created.

The engine is a four cylinder Model ETU Buda, suspended from three points. It is cast in block, has a detachable head and the bore and stroke is 4½ and 6 in., respectively. Speed is controlled to 18 m.p.h. by a Simplex governor, all connections of which are fully enclosed.

The lubrication system is full force pressure feed to all crankshaft, camshaft and connecting rod bearings. A seamless steel distributing pipe, which is cast in the crankcase, carries the lubricant to the main bearings from whence it is forced through the drilled passageway in the crankshaft to the connecting rod bearings. The oil is pumped from the oil reservoir beneath the crankcase by a geared oil pump in the center of the

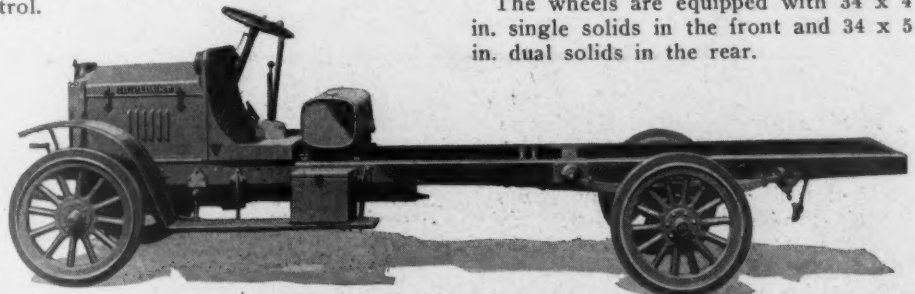
vertical tube type with cast tanks and frame. Cooling is assisted by a



Plan, Showing the Simplicity of Unit Assembly

belt-driven, ball bearing, four-blade fan mounted immediately behind the radiator.

Ignition is effected by an Eisemann G-4 high-tension magneto with manual control.



Side View of the Hurlburt Chassis With Solid Tires

Bollstrom Enters With Four-Wheel-Drive Trucks

BOLLSTROM MOTORS, INC., St. Louis, Mich., believes that trucks designed especially for transportation service in the coal, lumber, ice and oil fields should be constructed to meet distinct needs; that trucks engaged in work along these lines, traveling over all manner of road and field should have greater traction. Accordingly it was decided that power should be applied through all four wheels of the Bollstrom models. Models A-20 and B-21 are the two new 4-wheel drive jobs announced by this company. The former model was designed especially for fire work and the latter for the type of transportation service mentioned above.

Distribution of weight has been carefully analyzed and worked out in these models so as to get, with the truck fully loaded, proportional weight on each wheel. At normal load 40 per cent. of the load weight is on the front wheels and less than 60 per cent. on the rear wheels. This made possible the use of uniform sized wheels, tires and axles. It is pointed out that this is an important feature, inasmuch as the wheel units are interchangeable. It permits wheel changing anywhere even in the absence of service shop facilities. This idea of parts curtailment has been carried throughout the entire design, having been applied particularly to wheels, axles, differentials, shafts, brackets, brakes, etc., by careful designing.

The traction ability of the Bollstrom trucks is also advantageous in trailer service; in fact, the trucks are specially fitted for hauling trailers in addition to their regular loads.

Model B-21 has a loading platform that measures 168 in. long by 78 in. wide and is sold for \$5050 f. o. b. factory. The standard equipment includes the following: Governor, front fenders, side and tail oil lamps, dash, horn, complete set of tools, tool box and seat. The following is a brief description of its units, general assembly and special features.

The engine is a 4-cylinder, Model HA 200, L-head type, $4\frac{1}{2} \times 5\frac{1}{2}$ in. Hinkley, suspended from three points. Cylinders are cast in block with valves on the right side and two removable heads assure easy access to the cylinders. Its N. A. C. C. rating is 32.2 hp. Full force feed system of lubrication is employed. Oil

is fed to the main and connecting rod bearings and finally by special tube to the wrist pin bearings.

Ignition is effected by an Eisemann single high-tension magneto, equipped with an impulse starter. Fuel is fed by gravity to a Stromberg $1\frac{1}{4}$ in. carburetor from a 25-gal. gasoline tank.

The governor is one of the centrifugal type, Hinkley design and driven from the engine.

From the engine the power is transmitted through a Raybestos lined multiple disk, dry-plate clutch, having large friction plates, to a selective type transmission mounted amidships. This transmission provides four speeds forward and one speed reverse with the following gear ratios: First, 5.2:1; second, 3.864:1; third, 1.857:1; fourth, 1:1, and reverse, 4.66:1. The second two-speed

used, it is stated, because that method has satisfactorily demonstrated its ability to give mechanical efficiency at all speeds and loads. The front axle is of own make and the rear is a Clark. All gears of the rolling type and not the sliding friction type are used, bevel and spur and not worm gearing is used.

The radiator which is of own make is the tubular type. The upper and lower tank as well as the side members are cast iron. It is protected by a Mansfield radiator guard.

Both the rear and front propeller shafts are equipped with double universal joints, metal construction, which are of own manufacture, between the dropped gear box and front and rear axles with a slip joint to allow for spring action. Joints of the same style and make are used between the clutch and transmission.



New Model A-20 Four-Wheel-Drive Bollstrom Truck, Pneumatic Equipped
Weight distribution has been carefully analyzed so as to get proportional weight on each wheel

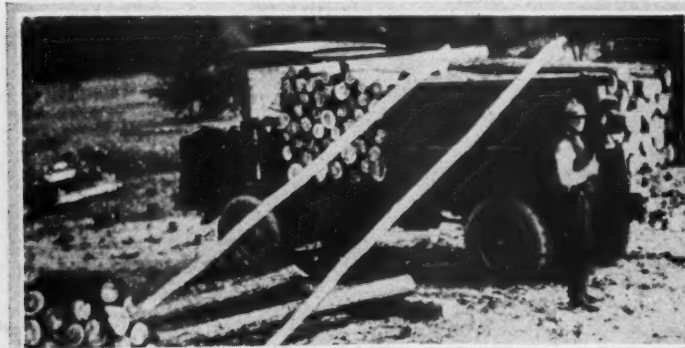
gear box, also mounted amidships with its two gear reductions, namely, .724:1 and 1.631:1, in conjunction with the reductions of the selective type gear box gives a total of eight speeds forward and two speeds reverse. This wide range of gear reduction permits of the proper selection of speeds most effective over the varied going of country service, saving the engine from excessive speed and assuring the most economical operation.

Final drive is through internal gear axles both front and rear. This type is

The brakes, which operate on the rear as well as the front wheels, are so arranged that the foot brake controls external contracting brakes on the rear wheels and that the hand brake controls both internal expanding on rear and external contracting brakes on front wheels.

The levers for the gear shift and emergency brake are in the center and the steering column of the Jacox steering gear is mounted at left for American market and at right for foreign market.

The hot-rolled steel 7-in. channel frame,



Two Fully-Loaded Bollstrom Four-Wheel-Drive Trucks in Logging Service Both on Field and Road

which is of the semi-flexible type, is supported by four semi-elliptic, chrome vanadium, Detroit steel springs. These springs both front and rear are three in. wide and are fitted with extra heavy

rebound clips. The spring eyes are bushed with phosphor bronze of S. A. E. specification. Propulsion and torque are taken through these springs.

The Clark metal wheels are equipped

with either pneumatic or solid tires. The wheelbase is 140 in., tread, 58 in.; turning circle, 56 ft.; chassis weight, 7900 lb., and speed on solids, 19 m.p.h.; on pneumatics, 28 m.p.h.

Bethlehem's New Special Delivery Model

EXPANSION of factory facilities was found imperative when the Bethlehem Motors Corp., Allentown, Pa., took over, on an increased production scale, the manufacture of its new line of trucks. Accordingly a new addition, which has since been completed, was designed to be annexed to the Allentown plant and to contain the added facilities necessary to cope with the new and enlarged scheme of production.

The new models consist of the 1-ton job, known as the Delivery Boy, a light truck built for speed, 2, 3 and 4-ton jobs. These capacities were determined upon after a long, intensive study of actual truckportation problems. With the exception of the 1-ton model the new models are similar in design throughout.

As the larger size trucks are all constructed along similar lines the following will be devoted to an outline of the 1-ton model K Delivery Boy, which not only contains different units, but, from necessity, being constructed for quick delivery, varies in the matter of assembly and disposition of parts.

The engine, which is alike for all models, is of the four-cylinder, L head design having a bore and stroke of $3\frac{1}{2}$ x 5 in., respectively. The cylinders are cast in block and have detachable cylinder heads. The large size main and connecting rod bearings are made of babbitt supported by bronze bushings. A patented hot spot manifold that is claimed to exact the proper amount of heat from the exhaust for rendering the intake mixture correct for complete vaporization is incorporated in the engine. Lubrication is through a pressure feed system, which includes oil passages leading to the main and connecting rod bearings and timing gears, cast or drilled in the crankcase and a powerful gear pump. An oil by-pass lubricates the timing gears. All other parts are oiled by the splash thrown off from the crankshaft. Ignition is through a Model B-4 Bosch magneto.

The Gray and Davis starting and lighting system which, incidentally, is employed on all four models, is of the two-unit type with Bendix drive from the flywheel. Knowing the tendencies of the average driver who, prefers to let the engine idle with a total disregard of the length of the period rather than restart the engine by hand, the company added self-starters to all models, thereby offsetting this universally practiced evil. With this equipment the driver has no compunction about shutting down the engine as it is but a simple operation requiring little effort to start the engine with the self-starter. The electric lamps which are mounted on dropped forged

brackets securely fastened to upright pillars of the radiator, are also of Gray and Davis design. All shocks that would otherwise be transmitted to the Willard battery, which is included in the equipment, is absorbed by a plate and spring arrangement on which the battery is mounted.

The carburetor is a Zenith of the non-adjustable type fed by gravity from a 10½-gal. tank equipped with a sediment trap. The adoption of the non-adjustable type is as a measure of precaution to protect the owner from expensive neglect and carelessness on the part of the driver when making carburetor adjustments.

The radiator is of the armored type with cast tank and pillars. Water is circulated through this large honeycomb radiator by the thermo-syphon system. All the water connections and passages in the radiator and engine are claimed to be of ample size to provide for adequate water circulation.

From the engine the power is transmitted to the clutch which is mounted in unit with the engine and transmission. The clutch is a 10 in., single, dry-plate Borg and Beck. The transmission is a Detroit and provides three speeds. A tubular carbon steel propeller shaft equipped with Spicer universal joints carries

the power to the rear wheels. The rear axle is bevel gear, semi-floating Columbia, equipped throughout with Bock roller bearings.

The front axle has the conventional drop-forged "I" beam section center-piece and chrome nickel steel forged knuckles. The steering knuckles are attached to the axle by a hardened and ground nickel steel pin and run on bronze bushings, lubricated by oil.

Steering is through a Ross, worm and nut type, steering gear mounted on the left side. Mounted on the column is an 18-in. wheel. All other controls are on the outside. The brakes are of the internal expanding and external contracting type and operate on 16-in. brake drums.

Four semi-elliptic chrome vanadium steel springs carry the chassis frame. The front springs are 36 in. long and 2 in. wide, single shackled in the rear and the rear springs are 50 in. long and 2¼ in. wide, also single shackled in the rear. In order to eliminate every possibility of the springs shifting on the axles the top leaves of each spring have been cupped up into a hole in the spring clip pad. The springs are of Mather manufacture and the spring pins are lubricated by the Myers patented system, which consists of an oil magazine which



Three-Quarter Side View of the New Bethlehem Quick-Delivery Job With Cab
This model, which is of one-ton capacity, is known as the "Delivery Boy"

feeds oil by wick. The pressed steel frame, which is of channel section 3-16 in. thick, is 32 1-16 in. wide at the rear with an insweep to 30 9-16 in. at front. It is 175 in. long. Depth is 4 7/16 in., top and bottom flanges at centers 3 1/2 in.

The wheels are wood, artillery type and consist of twelve spokes. They are equipped with adjustable tube roller bearings. Demountable rim equipment is also supplied. The wheels are fitted

with pneumatic tires measuring 34 x 4 1/2 in. front and 35 x 5 in. rear.

The wheelbase of this job is 125 in. and tread both front and back is 56 in.

The standard equipment includes the following: Myers magazine oiling system, electric starting and lighting system, electric horn, ammeter, oil pressure gage, motometer, spare pneumatic tire rim and installing equipment, complete tool kit and jack in box under seat.

side to side. Enclosed heavy coiled springs absorb road-shock, preventing the steering arm from bending. The swinging steering arm connects the steering mechanism on the axle to the steering parts on the frame. It swings parallel to the action of the springs and preserves the steering gear alignment regardless of spring deflection. An independent steering arm connects the steering gear to the drawhead or frame, as required and allows the trailer to be steered by hand independent of the drawbar either in going forward or in backing. This eliminates all necessity for unhooking the trailer from the truck in maneuvering, and saves loss of time as well as danger of injury to the operator. The drawhead connection is another feature. It locks the drawbar in place automatically so that the trailer cannot be detached by accident after once having been locked to the truck. Both the semi-trailer and pole types have same features as the 4-wheel reversible model just described.

In the construction of these trailers, extra heavy roll section channel steel is employed and the frame is heavily reinforced and solidly braced. The steering arms and spindles are chrome vanadium steel, and the beds or "I" sections are S. A. E. specification steel No. 1045. Timken bearings are used throughout. Solid pressed-on tires of standard tread are used in sizes to meet the requirements of the various types. Byron trailers are being built in 3-ton and 5-ton capacity in the 4-wheel reversible type; 6-ton and 4-ton in semi-trailer models, and 4-ton and 2 1/2-ton pole trailers.

Byron Trailer Makes Debut

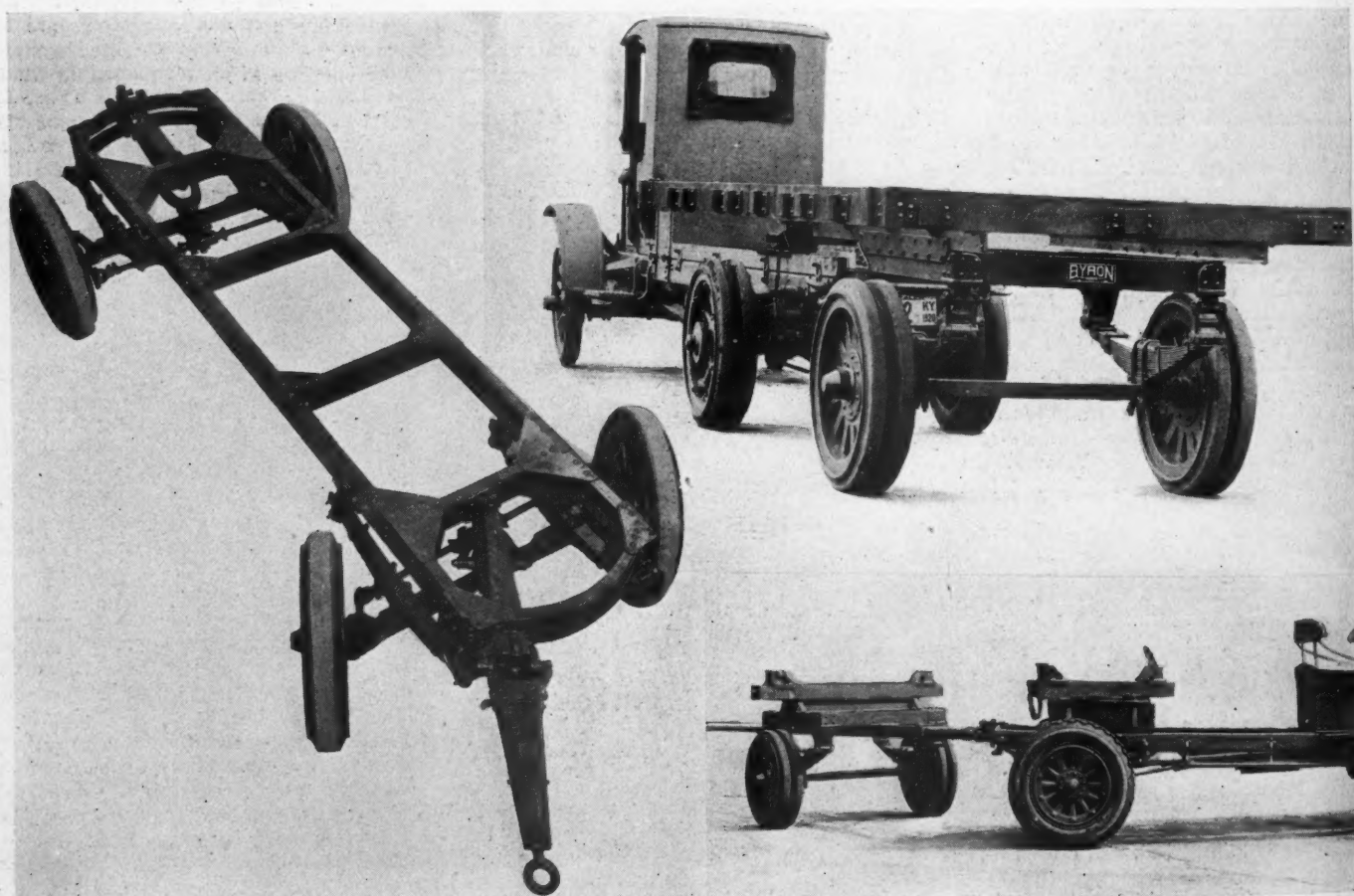
AFTER several months spent in building their new factory, the Byron Engineering Works, Louisville, Ky., is now in full production on a complete line of heavy-duty trailers. The new product is known as the Byron Trailer, after the designer, O. E. Byron. Mr. Byron, who is vice-president of the new organization, is well known in the trailer business, having been associated with several leading manufacturers of trailers during the past ten years.

The other principal officers of the Byron Engineering Works are: Graeme McGowan, president, and Walter McGowan, secretary-treasurer. Both men are prominent in business and financial circles in Louisville, and it was through their influence that Mr. Byron selected Louisville as the manufacturing headquarters for the Byron trailer.

The Byron Engineering Works occupies a modern factory building 80 x 200

ft., which has a capacity of about one thousand trailers a year. Additional ground adjoining the present factory has been secured, a preparatory measure for increased factory facilities.

Byron trailers are now being built in various designs of the 4-wheel reversible type, as well as in semi-trailer and pole types. The line is intended primarily for heavy-duty hauling, and is therefore being manufactured with special attention to sturdiness of construction and ease of operation and control. The chief distinctive feature of the Byron trailer is found in the steering mechanism, which was designed by O. E. Byron. It embodies numerous new and advanced ideas in trailer construction which are claimed to add materially to the efficiency of the job. The ball-and-socket joint keeps the steering gear in perfect alignment regardless of the position of the trailer frame in striking bumps or in rocking from



Views of the Byron Four-Wheel Trailer, Semi-Trailer and Pole Trailer, All Designed Primarily for Heavy-Duty Hauling

New Miami Semi-Trailer Has Two Time-Saving Features

IT has been demonstrated that a 2-ton truck and a 6-ton trailer, equipped with the patented automatic coupling device soon to be put on the market by the Miami Trailer Company, Troy, O., will minimize operating expenses and eliminate much of the overhead due to waste in time coupling and uncoupling tractor and trailer under the old system.

In the operation of the new semi-trailer the driver, without leaving his seat, can couple and uncouple the truck instantly. The construction of the device being foolproof, it is claimed that no mistake or misjudgment of the driver could have the effect of dumping the load or damaging the trailer.

In addition to the automatic coupler the new semi-trailer is equipped with an electric brake operating on the wheels of the trailer and controlled by push buttons on the truck steering wheel. The power is furnished by a storage battery under the driver's seat. Plungers, operating on springs on the front of the trailer and the rear of the fifth wheel of the truck, form the connection through which power is transmitted from battery to brake. The power of this brake is said to be such that the entire truck and trailer load can be held on any incline without resort to the truck foot brake.

Side rock is asserted to be eliminated

in the new semi-trailer by reason of the operation of the fifth wheel, which pivots laterally on a traction ball center and two friction shoes in circumference. Shock springs take up the jar on the uneven roadways, protecting and prolonging the life of the truck. The fifth wheel is adaptable to any truck frame without any adjustment being required.

The fan-shaped entrance to the coupling slot permits of the coupling and uncoupling of the trailer at any angle, and teeth in the fan-shaped plate allows pick-up no matter at what angle the truck is backed into the trailer. The coupler engages itself automatically behind the traction boss on the upper side of the fifth wheel when the same is engaged fully in the middle section.

In uncoupling the automatic trailer is depressed by a trigger, operated by a cable from a hand wheel at the driver's seat. When the coupler is depressed the truck leaves the trailer and the jack drops automatically into carrying position beneath the trailer, the jack reaching the carrying position before the trailer is fully released from the truck fifth wheel.

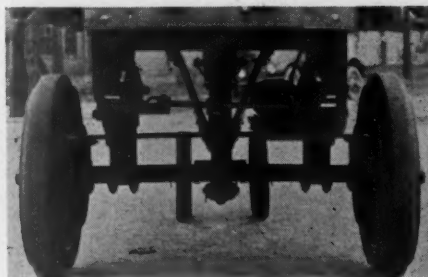
In coupling the truck is backed beneath the trailer, the traction boss riding over the coupler deflects it and when the traction boss has passed the coupler springs into position.



General View, Showing Features of the New Miami Semi-Trailer



Note Teeth in the Fan-Shaped Plate
This permits a pick-up no matter at what angle the truck is backed into the trailer



Trailer Supported by the Jack
This jack is automatic and hoists into a traveling position when the coupling is made

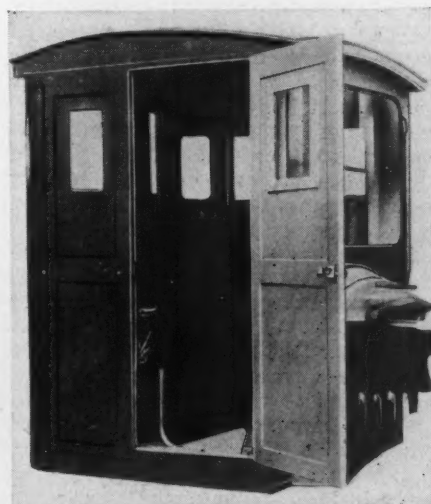
The cable operating the automatic jack lift is engaged automatically between the fingers of the segment on the rear of the fifth wheel and the jack is hoisted into traveling position as the coupling is being made.

The brake motor being reversible, permits release of brake instantly and the brake application is graduated to any degree of power. It is impossible for the brake to leak off while the trailer is uncoupled, but it may be released by hand when it is desired to move the trailer without the truck. The battery makes a generator on the truck unnecessary.

One of the most important advantages of the automatic coupler from the safety first standpoint is the fact that the leg wheels drop into position automatically in the event of an emergency in which the truck and trailer are uncoupled, though the mechanical construction is such as to make that contingency very remote.

Acme Announces New Type Winter Cab

To meet the demand for an enclosed winter cab the Acme Motor Truck Co., Cadillac, Mich., developed a standard



New Standardized Winter-Type Acme Cab Designed for Any Acme Chassis

winter cab that can be furnished on all its models. It has been designed so as to preserve the lines of the standard open cab, retaining the neat appearance and clean-cut lines. This new type cab is constructed of oak. It is built around the regular seat box and is therefore readily applied to any chassis now in service. All points of stress are well ironed.

The side sections consist of waterproof veneer panels, curving toward the rear with curved sheet metal corner construction running full height as in the open cab. An opening $5\frac{3}{4} \times 11\frac{1}{4}$ in. fitted with Pyralin is provided in each corner, so that the driver has a clear view of approaching traffic from either side. Sliding windows that are easily closed and opened for ventilating purposes are provided in the back of the cab. Each side panel has a 6 x 11 in. Pyralin light. The doors run full height of the cab with a 9 x 11 in. Pyralin light which can be

increased approximately to 10 x 15 in. The doors swing toward the front and are provided with locks designed to prevent rattling. The top follows the standard Acme cab construction, curved and substantially built of ribs and slats covered with a heavy grade of oil duck.

Where chassis are ordered with winter cab complete at factory a ventilator will be placed in the dash to supply heat from the engine to the cab interior. For

summer driving the doors can be easily removed and curtains, which are supplied with the cab, can be used. The price of this cab is \$125.

The general dimensions of this cab is as follows: Width, 48 in.; height from top of frame, 61 in.; depth from front to rear, same as standard cab; height from top of cushion to inside of roof, 40 in.; ventilating windshield, length, 41¼ in.; ventilating windshield, height, 23½ in.

Novel Two-Way Gravity Dump Body

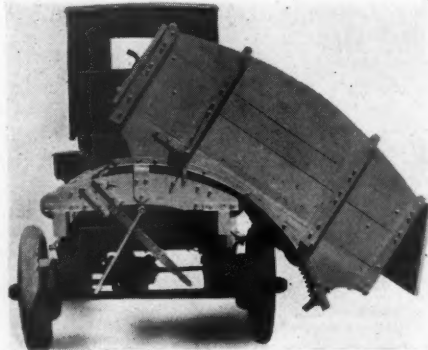
THE Berbrewco, as this novel two-way gravity dump body put out by the Bergstrom-Brewster Motor Company, Denver, Colo., is termed, has been designed to meet a varied demand. It is adaptable to many types of contract work, general hauling and even for general freighting purposes. Fields of service where the carrying and dumping of gravel, crushed rock, ore, coal, ashes and many other commodities has figured as a big factor find it valuable as a time and labor saver, and dependable for thorough work. Another body built almost along identical lines, but constructed especially for the hauling and dumping of sugar beets, grain, rough lumber, etc., is also offered by this company. It is known as the Berbrewco beet body.

The floor, which is constructed of 1¼ in. hardwood, is laid crosswise. This construction not only makes for rigidity, but also places all the wear and tear of the dumping friction with the grain of the floor boards. The end gates are fastened to the floor and reinforced with heavy corner irons. One inch bars suspended from the corners of each end gate support the side gates. They swing on heavy forged hinges, but are held firmly in place when not swung out for dumping purposes by a three-bar lever switch. This latch is operated as a unit from the rear of the body.

The body proper is mounted on a sub-frame with crowned bolsters, each of which is equipped with four or five shive wheels on which the weight of the body

is carried and rolled to one side or the other. The cross bolsters of the body are heavily ironed and form a tract which rest securely in the flanged shive wheels. Grease chambers provided in the wheels permit of proper lubrication at all times when packed with graphite.

Dumping power is applied through a cold-rolled steel shaft extending the full length of the body with a crank at the



Rear View of the Berbrewco Dump Body

rear. The pinion gears at each end of the shaft transmit the power to the reduction gears on the countershaft, which, in turn, mesh with the cogs of the heavy cast racks attached to the end bolsters of the body. A touch of the crank will start the load in motion and any discharge angle desired, up to 45 deg. may be obtained. The body dumps by gravity, the reduction gears merely reduc-

ing the speed of the body when dumping and reducing to a minimum the effort required to roll the body back into normal position.

The bed is held firmly in place on the sub-frame and the gears held in mesh at all times through the use of heavy interlocking latches at the front and rear ends of the body. These latches provide this safety service when the body is in normal position as well as when rolled to any dumping angle. A safety iron is also provided to serve as a stop for the bed when it has reached the discharge angle of 45 deg.

To hold the body in a positive upright position two heavy forged locks are used, one at each end of the bed and on the opposite sides of the main shafts. These locks protect against the possibility of the body being dumped prematurely by an unbalanced load or by the jars of an unbalanced road.

If desired the body will be lined with metal, the cost of this equipment depending upon the thickness of the metal used.

This job can be obtained in any of 26 models only differing in such specifications as length, width, depth and cubical content. They range in model numbers from No. 501 to 527 with capacities of from 1 cu. yd. to 5 cu. yd. and prices of from \$190 to \$375.

Rainier Announces New Models

The Rainier Motor Corp., New York city, announces numerous improvements and betterments in their new 1921 models which are now ready.

In the 1-ton, now known as Model R-19, the wheelbase has been increased to 133 in. and loading space to 9 ft. 6 in. Tire sizes both front and rear have been enlarged. Other improvements include: Heavier steering gear, new style pedals and control and a larger radiator. Chassis price is unchanged, \$2350.

The 1½-ton now called Model R-16 is larger than formerly. Wheelbase has been lengthened to 147 in., giving a loading space of 10 ft. 6 in. The 3¼ Model "N" Continental engine is now used and the Brown-Lipe Model 30 transmission has been substituted. Other changes are: Heavy Ross steering gear, heavier propeller shaft with 3 universal joints and a center ball bearing, new style pedals and control and a new type radiator. Tire sizes have been increased. Price of chassis, \$2600.

The 2-ton chassis is the same except that it has a larger engine, the 4½ x 5¼ in. Continental, a Model 35 Brown-Lipe transmission and a new style radiator. The ¾-ton Model R-11 is now standardly equipped with 35 x 5 cord tires. Chassis price, \$2150.

Deliveries will commence this month on a new 3½-ton model. The following is a resume of specifications: 4½ x 6 Continental engine, Brown-Lipe clutch, Brown-Lipe Model 60 amidships, 4-speed transmission, Timken worm-driven, rear-axle, wheelbase 170 in., frame 8 in., Ross steering gear, Spicer joints, magneto ig-



Dumping Position of the Berbrewco Two-Way Gravity Dump Body
This body rolls over crown bolsters to one or the other side as the case may be. The load is discharged through the side.

niton, tires 36 x 5 dual rear and 36 x 5 single front. Chassis price \$4500.

An additional model of 2½-ton capacity is in the course of production on which deliveries will be made about January 1. It will have a Continental engine, 4½

x5¼, Brown-Lipe three-speed transmission mounted amidships, Ross steering gear, worm-driven rear-axle. Rear tires 34 x 7, front 34 x 5. This chassis will be made in two size wheelbases, 158 in. and 170 in. Chassis price \$3400.

Collins Ford Slip-on Products for Farm Service

THE Collins Plow Co., Quincy, Ill., manufacturers of farm implements, baling presses and wagons, is presenting a new addition to its line; bodies and cabs for Ford trucks.

The Slip-on body for use on Ford roadsters, one of the new products, can be attached to the roadster chassis with little difficulty. Provision for easy access to the storage battery when the body is in place has been satisfactorily arranged by a trap door in the front end of the body platform. Other features are the utilization of steel wherever metal parts are required, no cast parts being used, and the special, anti-rattle end-gate. The panels, which are 8 in. wide, and the flare boards, which are 5 in. wide, are of wagon, box-board lumber. The bottom, which is 34 in. wide and which is supported by three cross sills of selected hard wood, is constructed of tongued and grooved long leaf yellow pine boards. The entire body is 60 in. long and weighs 100 lb.

The Collins grain body, for Ford one-ton chassis, is constructed of the same grade of materials contained in the slip-on job. The design being larger and the purpose of the body different, the amount of material and the construction is naturally greater and somewhat altered. The following represents some of the principal differences: Extra panels, no flare boards, four cross sills instead of three, eight side pieces, four hold-down rods, grain cleats and Comstock end gate. The length is 90 in.; width, 58 in.; lower panel, 14 in.; middle panel, 12 in.; and upper panel, 10 in. This body is constructed in two styles, style 20, which weighs 375 lbs. and style 30, which weighs 450 lb.

An extra attachment to be used in con-

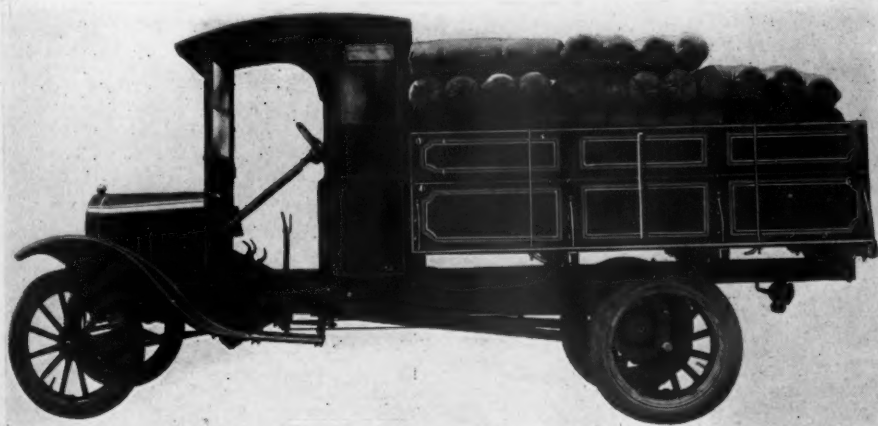
nection with the grain body on Ford trucks, known as the Collins-Victor shoveling board, can also be obtained if any special farm service warrants its use. The wings or sides of this shovel are made of stiff steel and the bottom of yellow pine rigidly secured by two hard wood cross cleats. The width between wings is 61 in.; maximum height, 36 in.; and approximate weight, 70 lb.

The Collins cab is strongly constructed. The frame is of selected hard wood, the panels are of sheet-steel, and the floor,

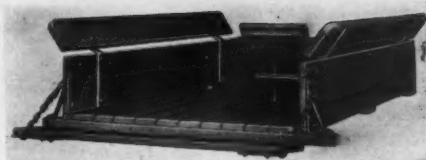


Collins Cab, Style 60, for Ford Trucks

back and sides are of yellow pine. Driver comfort and convenience along with neat appearance are points that were not lost sight of when the cab was originally designed. Clear and unobstructed vision is afforded the driver through a vertical bar windshield, one of the features of the cab, as there are no interfering cross bars.



Side View of the Grain Body Designed Especially for a Ford One-Ton Truck



View of the Collins Slip-on Body

Note the trap door which provides access to the battery

A two-piece seat cushion allows the gasoline tank to be filled while the driver is at his seat. A tool box is provided under the right side of the seat. Standard sized glass is used in all the sashes. The back of the cab is constructed exceptionally solid so as to protect itself against possible damage sometimes occasioned by the load shifting forward. The following is a brief resume of specifications: Two-piece windshield, 16 x 20 in.; side windows, 10 x 14 in.; back window, 10 x 14 in.; door window, 16 x 18 in.; two-piece cushion, 18 x 41 in.; net weight of cab complete, 250 lb.

Luverne Motor Truck Units

The Luverne Motor Truck Co., Luverne, Minn., which has for a number of years manufactured truck units of several sizes and suitable for combining with any make of passenger car, has recently added to its line two new truck unit models.

The one is a full frame rear-end unit, which is furnished with a full length channel steel frame, of length and size to meet the customer's requirements, and with front spring hangers placed so that the old front axle and springs will fit them. When this unit is used, the old passenger car frame is discarded entirely, and the motor, transmission, etc., are mounted into the new frame. The result is a much stronger and more truck-like looking completed job.

The other new truck unit model is a front end unit, designed for combining with rear end units which have been attached to passenger cars and have outworn the engine and passenger car parts, leaving the rear end in good condition. This front end unit consists of a full length channel steel frame, with spring hangers attached for both front and rear springs to conform to dimensions of same, and has installed in the frame a four- or six-cylinder truck engine complete with clutch, transmission, propeller shaft back to the center cross piece, steering gear, radiator, hood, dash and fenders. All that is required is to place the front and rear axles under the chassis, put in the spring bolts, and connect up rear propeller shaft.

This company also includes in its line of units, several styles of truck bodies, and cabs, also all sizes of wheels and rims for giant pneumatic tires.

Correction

In the description of the new Gramm-Bernstein speed truck which appeared in the November issue of the COMMERCIAL CAR JOURNAL, page 39, statement was made, due to a typographical error, that the tire equipment for both the front and rear of this truck is 35 x 5. This measurement is incorrect as it is 33 x 5.

TRUCK EQUIPMENT AND APPLIANCES

Interchangeability of Parts a Feature of Vulcan Axles

DESIGNED and produced by men who have had the advantage of many years' experience in axle building and who are familiar with the requirements of dealer and consumer service, Vulcan axles now in production by the Vulcan Motor Axle Corporation, Detroit, have a number of interesting features. Effort has been directed towards producing a high grade standard axle in which the best of material and workmanship are incorporated and one which adheres to those principles endorsed by sound engineering practice. In designing this axle consideration has been given to the distributor and dealer by the use of interchangeable parts and the statement is made that the axles require from 25 to 33 per cent. less parts than conventional designs. This feature should appeal to the dealer required to stock parts by the factory or distributor.

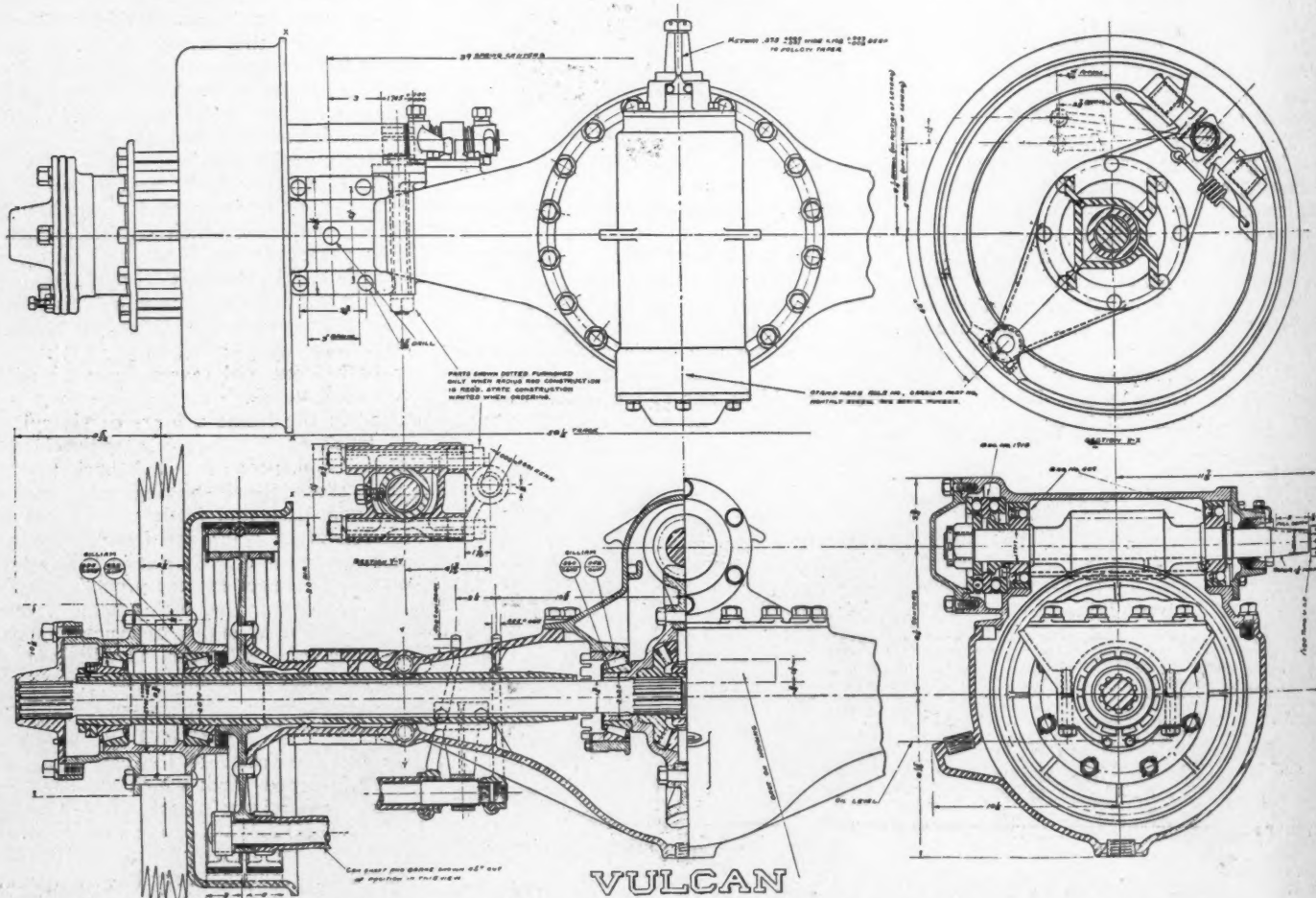
The design anticipates to a large extent the factor of service in truck sales

as those components requiring adjustment are readily accessible and are not complicated in construction or assembly. The brake assembly, for example, illustrated herewith, is extremely sturdy and simple.

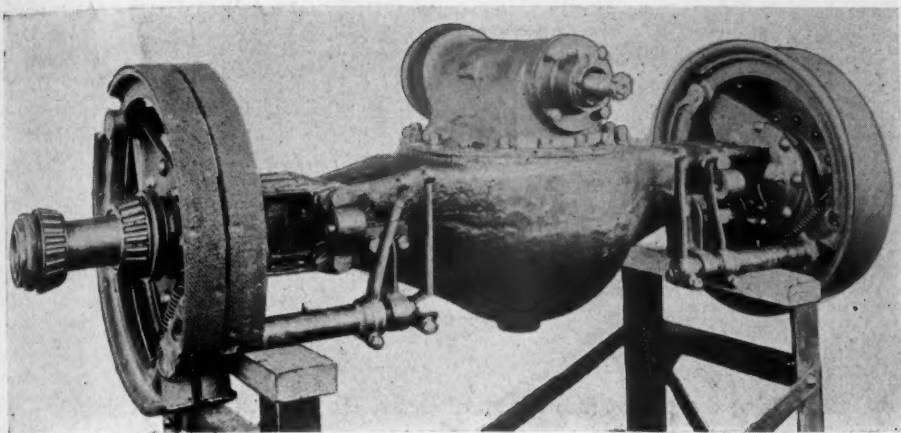
The brakes are double internal expanding and in designing consideration has been given to the increasing use of pneumatics and the carrying of loads at high speeds. The manufacturers claim that the Vulcan brakes afford considerably more braking capacity than designs of similar load rating and that it is brought about in two ways: First, by increasing the brake diameter over normal sizes and by an improved method of supporting the brakes on either side of the brake spider, avoiding loss of brake pressure brought about by distortion. Second, the maximum actual braking surface is held to be 85 per cent. of the drum circumference. Maximum brake efficiency is important in these days of increasing traffic and claim is

made that the life of the brake lining is prolonged because of this increase in brake area, approximately 15 per cent. over that of conventional practice.

A greater co-efficient of friction is secured by machining the brake drum surface contacting with brake lining. The brake shoes are unusually sturdy and interchangeable, one shoe filling eight functional positions on each axle. The adjusting studs, also interchangeable, have a slot milled across the face in which the expanding cam lies, and the outer ends of the studs have a reamed fit for piloting. The inner ends of these studs are threaded and the adjustment for wear of brake lining is quickly and easily accomplished by pulling the brake shoe away sufficiently to clear the cam and turning the adjusting stud in or out one-half a turn at a time. The springs are also interchangeable and are so constructed and anchored that they can be removed or replaced easily and quickly. The elimination of bolts, nuts and other



Assembly of the Vulcan Two and a Half Ton 4-R Rear Axle

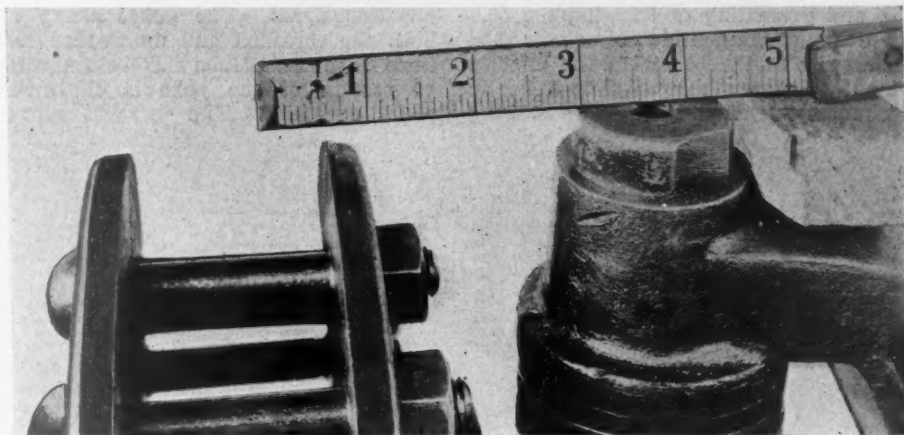


The Vulcan Full-Floating Worm-Drive Axle and Showing the Brake Lever Assembly

small parts subject to rust, etc., and simplicity of design is held to reduce the time of assembly and reassembly from 25 to 50 per cent. The brake levers have S. A. E. ends, with their location interchangeable with other standardized construction. The brake camshafts have self-lubricating bushings and the shaft bearings in housing are bronze. Springs are inserted between brake levers to care for slippage and to prevent rattling.

Unusual Mounting of Worm

An accompanying illustration shows that the mounting of the worm provides for a large factor of safety in bearing capacity. The worm is of chrome nickel steel, heat-treated and ground to size and S. K. F. self-aligning radial bearings on either side of the worm care for the radial load. The forward bearing has a floating fit to care for expansion or elongation of the worm. The thrust is compensated for by an extra large double thrust bearing. This bearing is independent of the rear bearing. The worm wheel, made of a special analysis bronze, is bolted to the dif-

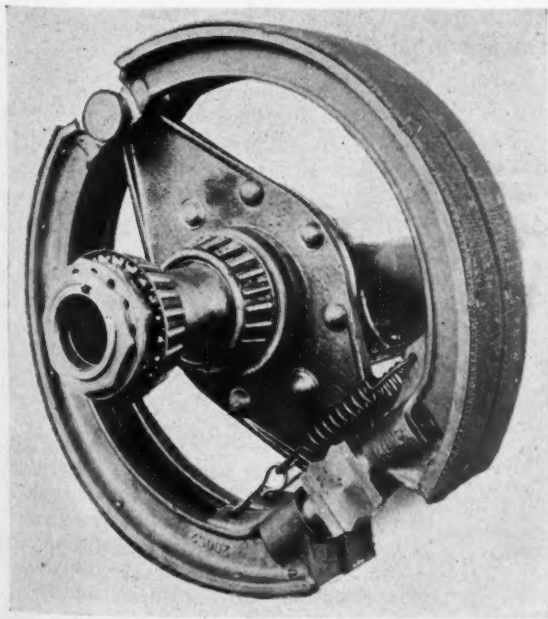


Illustrating the Knuckle Design Whereby the Center of Spoke is Brought Extremely Close to the Center of Knuckle Pin

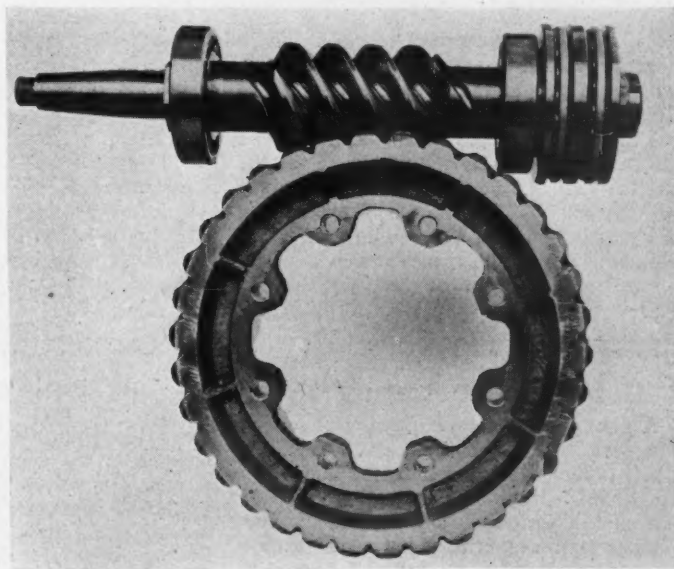
ferential housing and the bolt holes are reamed for a force fit. The locking nuts are castellated. All worm wheels are jig drilled.

The differential is a standard four-pinion bevel gear type, but the gears are not only carefully and accurately cut but the finish is above standard practice.

ventional design. The heat-treated chrome nickel steel axles or drive shafts are of the full floating type. The ends are splined and the drive plates are drop forged. Extra large felt washers are employed. The splash system of lubrication is employed with a fixed oil level and oil gutters are incorporated to supply lubricant direct to the bearings.



Brakes Shoes Are Interchangeable as Are the Adjusting Studs That Have a Milled Slot Across Face for Cam and Inner Ends Threaded Into Brake Shoe

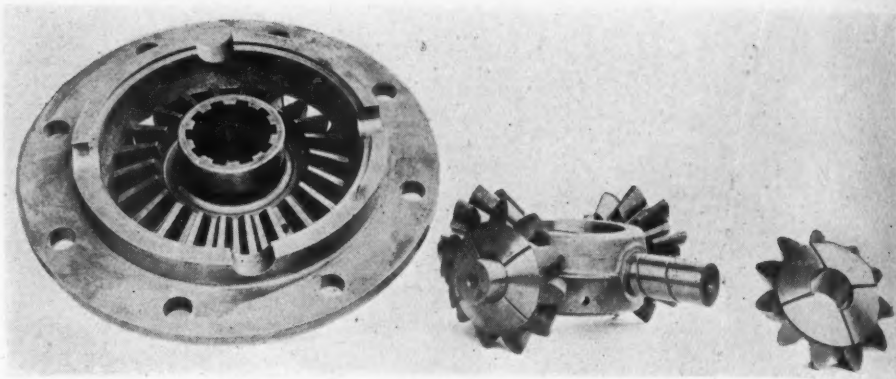


The Worm Has a Radial Bearing at Either End and an Extra Large Double-Thrust Bearing Independent of the Radial Members. The Forward Bearing Has a Floating Fit

The line of rear axles includes three capacity sizes, 1½-ton 3-R; 2½-ton 4-R and 3½-ton 5-R. The details of the various sizes vary according to capacity. The design is standardized and each part is held to close limits.

Producing Front Axles

This company is also in production with a line of front axles of three capacity sizes, namely, 1½-ton 3-F; 2½-ton 4-F and 3½-ton 5-F. The axles are of the standard Elliott type. The design of the steering knuckle is such that it rotates on the steering pin which is locked in the axle center jaws, avoiding the possibility of springing or distortion under heavy loads, the two ends of the jaws being held in a fixed position. Special emphasis is laid on the knuckle design, making for easy steering and permitting of bringing the center of the spoke considerably closer than customary to the center of the knuckle pin, the distance being indicated by an accompanying illustration. The steering

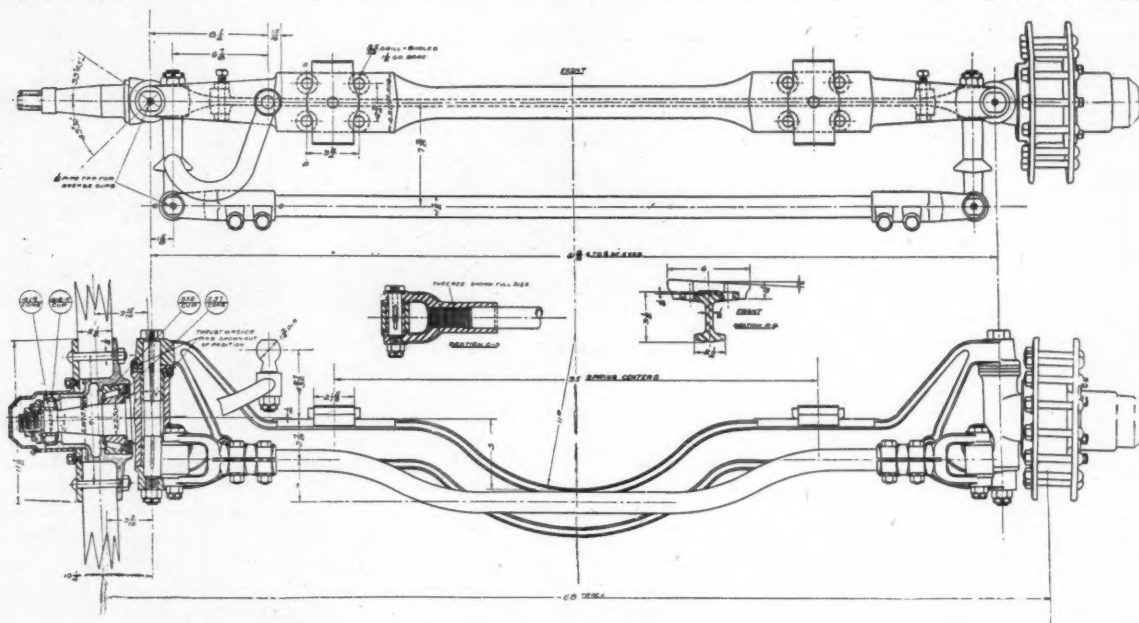


Illustrating the High-Grade Finish of Gears, Etc., in Differential Assembly

The construction of the cross tube yokes is interesting in that a large factor of safety is provided where stresses are centralized. The yokes clamp on both the threaded and unthreaded sections of the cross tube and the unthreaded section of the yoke is chamfered about one-third. The location of the

manship and material and rigid inspection characteristic of the rear axle is employed in the manufacture of the front axle.

The Vulcan Motor Axle Corporation is well equipped to care for a large production as its inventory is sufficient to provide a dependable supply of both



Assembly of the Vulcan Three and a Half Ton 5-F Front Axle

knuckles are oversize, forged from chrome nickel steel and heat treated. The axle proper is I beam section with drop-forged axle center.

The steering arms are heat-treated chrome nickel steel forgings and the single arm can be used on either right or left side. The double arm forging is so designed that by bending the double arm post in the rough it can be used on either the right or left side as required.

cross tube when in yoke and locking construction are shown in an accompanying illustration.

The wheel spindles on all bearing surfaces are accurately ground to size and held within strict limits. The wheel bearings are Gilliam adjustable tapered roller bearings. All bearing surfaces are equipped with hardened and ground bushings. Adjustment is provided for regulating the throw of the steering knuckle. The same high grade work-

types. The company is optimistic as to the future of the truck industry and is building a supply of axles to meet a condition similar to that which existed during the war when lack of basic raw materials and labor created a seller's market. The executives of the company have long been identified with truck axle construction, distribution and service and believe they offer the trade types that embody many improvements.

Graphite Penetrating Oil

A new product being introduced by the Thomson Auto Specialties Co., Columbus, Ohio, is an effective penetrator known as Thomson's Graphite Penetrating Oil. It carries the graphite lubricant easily and quickly to the innermost parts of springs. A few drops squirted on the edge of each leaf rapidly work through the spring, and in a few minutes come seeping through on the other side.

This oil dissolves rust and cleans thoroughly. It carries pure graphite in solution, depositing it as a dry film on the surface of the leaves. The graphite lubricates perfectly, while the liquid element of the oil evaporates quickly. Other uses for which it may be utilized are for releasing frozen brackets, equalizing brake linings without taking off wheels or heating joints, releasing bolt or pin when held firmly by rust, and for shackle bolts and king pins.

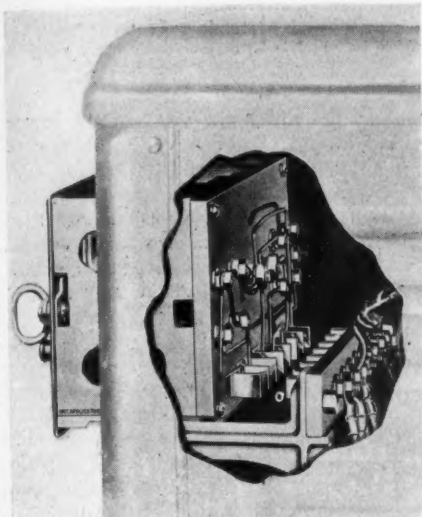
The Crown Battery

The point upon which the Crown Battery Co., Detroit, Mich., lays particular stress in the construction of the Crown battery, is the high-grade quality of its plates. The plates combine to a high degree, the features of porosity and hardness, thus insuring a high rate of discharge and long life. In addition the cases, rubber jars and separators, unite in making this battery of high quality.

Electrion Farm Electric Plant is Thoroughly Developed and Refined

A 32-VOLT farm electric plant which combines utility and attractiveness is being made by the Lindermen Steel & Machine Co., Dayton, O. A 110-volt outfit also is made.

In general appearance it is very simply constructed. Every unit, except the batteries, is assembled in a very attractive cabinet enameled in peacock blue. The batteries are grouped in a wooden case which likewise presents a clean and at-



This Shows the Connections on the Removable Control Case of the Electrion, as They Slide Into Place in Their Respective Terminals.

tractive appearance. It excludes dirt and moisture and provides practically complete protection for the batteries.

The 32-volt unit is semi-automatic in operation. By pushing a button it starts, and when the battery is fully charged the engine stops automatically. Also, when the battery becomes about three-fourths discharged, it is automatically cut off from the line to prevent damage to it through exhaustion.

There is an automatic circuit-breaker which disconnects the lighting circuit from both the generator and the battery, in the event of a short or an overloaded circuit. This protection obtains whether the plant is running or idle.

The semi-automatic outfit can be converted into a full-automatic outfit at any time, simply by removing the control case and putting in a control case of the type used in the full-automatic plant.

All the vital electrical apparatus of the Electrion plant is centralized in one removable unit. This is the control case. This unit is at the upper part of the cabinet face and slides in and out of position just like a drawer in a desk. Any trouble in the special electrical part of the plant is centered in the case. The user need only remove the case, have the dealer insert another, and send the one which is out-of-order back to the factory for free service and adjustment. This

occasions practically no delay or interruption in the service of the plant. The three exposed parts of the control case are the start button, the stop button, and the light switch.

The Electrion plant is equipped with an electromagnetic governor which acts on the throttle to keep the engine running at the proper constant speed regardless of variations in load due to different current demands.

Fuel is fed to the engine of the Electrion through a carburetor, which is very simple in construction. There is no float or float valve. There is no float chamber or air valve. There is no spring. The only movable part is a needle valve which can be removed, it is said, without permitting any of the fuel to run out. The air for the fuel is taken through the crank-case breather and over the top of the cylinder head to be pre-heated before entering the carburetor.

The engine is cooled by an automobile-type radiator and fan. The fan can be adjusted to take up slack in the belt. To protect the plant against damage, should

the cooling water reach a low level, there is an automatic cut-out in the form of a float-valve operating in a water column just back of, and in connection with, the radiator. When the water reaches a low point, this valve grounds the magneto.

The gasoline tank for the Electrion is in the base of the cabinet. It has a capacity for $2\frac{1}{4}$ gal.

Ignition is provided by a Dixie high-tension magneto. Lubrication is very simple. There is only one place where oil is applied. A sight oil-gage warns when oil is needed. There is a large grease cup for lubricating the fan bearing. Engine lubrication is by splash.

The engine has a single, vertical cylinder with a bore and stroke of $2\frac{3}{4}$ in. and 3 in., respectively. It is controlled to 1600 r.p.m. Valves are nickel-steel. The camshaft is drop-forged, machined, heat-treated and ground. All the parts are made of high-grade material finished to close limits. The main bearings are over-size S. K. F. self-aligning, double row.

For power take-off, a pulley can be attached. This is not provided as regular equipment, but can be obtained, if desired.

A compound-wound generator is used. One winding charges the battery in proportion to its charged condition, providing a lower rate of charge as the voltage of the battery increases. The other winding is a compensating provision, which causes the generator to furnish additional current for the line as the load increases. Thus, a sudden demand for a large supply of current causes only a small drop in the voltage, and vice versa. It is claimed that no reversal of the generator polarity can occur. The brush holders are non-adjustable. The brushes cannot be shifted from their proper position and, barring accident, will last indefinitely without attention, according to the maker.



Neat, Compact Cabinet in Which the Units of the Electrion Farm Electric Plant Are Housed

All the units, except the batteries, are contained in this metal cabinet which is enameled a rich peacock blue

Specifications of 32-Volt Electrion

Capacity	100 watts
Number 20-watt lamps	50
Lamp voltage	32
Make of engine	Own
Number of cylinders	1
Horsepower	$2\frac{1}{2}$
Fuel	G or K
Generator drive	Direct
Make of Generator	Own
Height of Electrion	29 in.
Width	16 in.
Length	28 in.
Net weight	450 lb.
Shipping weight	550 lb.

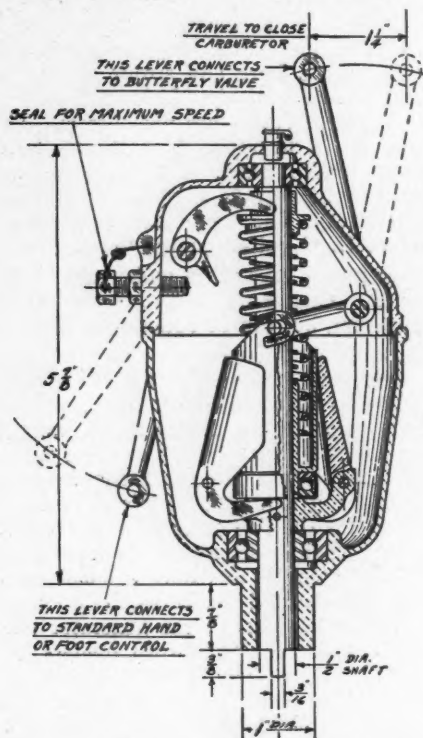


This Portable Dust-Proof Cabinet Houses the Storage Batteries of the Electrion Farm Electric Plant

Attention is called to the fact that a housing of this kind tends to keep the hydrogen gas fumes from the batteries from escaping into the room in which the batteries are kept. These fumes corrode material with which they come into contact.

Governor for Tractor and Truck Engines

Much time and money has been spent by engineers and designers in the attempt to develop a governor that would control the motor under all the varying load conditions to which it might be subjected. Peculiar conditions are to be met with in the handling of the gas to an explosive motor. One of the difficulties that has been encountered is surging, and this, of course, has a very erratic influence on the speed of the engine. Still another, and more different problem to be met with, is that of getting close regulation from full load to no load. On tractor engines used in belt work, especially in threshing, this has proven a serious handicap. It is also known that a separator to do good work must have a very close speed regulation. The demands as far as regulation are con-



"Varispeed" Governor

Manufactured by the S-W-S Co., Minneapolis, Minn., and designed for tractor and truck engines

cerned are very exacting, and a wide variance in horsepower load is experienced.

Realizing the conditions that existed, and the problems to be met, the S-W-S Co., Minneapolis, Minn., after having spent a great deal of time in study and experiment, is prepared to offer manufacturers and users its "Varispeed" governor. This has only been done after the exhaustive and exacting tests, subjecting it to every condition to which a governor could be subjected in actual use, and on various makes of gasoline engines.

The accompanying illustration shows its simple construction and correct mechanical principles. It requires very little space for attachment, and is in a dust-proof oil-tight case.

It is absolutely automatic in action, preventing the engine from racing when the clutch or load is suddenly released, and accurately takes care of all load variations.

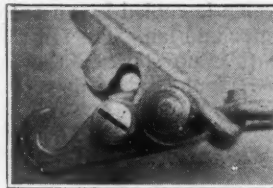
The speed of the engine may be varied by regular hand or foot controls, as the engine is controlled at all times through the governor, especially adapting it for tractor and truck use. If desired, the governor can be set to limit the speed of the engine, and this speed having once been set cannot be changed. Tampering or changing is exposed by the condition of seal with which the governor is provided.

This governor is equipped throughout with bearings. Another valuable feature is the long travel on the ball and sleeve, which, in combination with the long spring, prevents "hunting," a detrimental action to the engine.

The governor is mounted in a vertical position, and is driven by the cam-shaft or any other accessible part of the engine.

Skid Chain Fastener

A new method of attaching skid chains will be found upon inspecting the Faus fastener, made by Jacob Faus, Jr., 1917 Twelfth St., Boulder, Colo. This device comes in rights and lefts and, the maker states, is dependable under all conditions. It is absolutely locked when applied, the



Faus Fastener

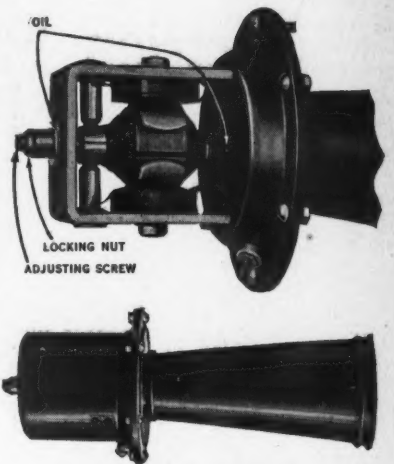
A device that provides an easy means for fastening skid chains

screw being given three turns to draw it up tight. These simply constructed steel fasteners are coated to prevent rusting. The price is \$1.75 per set of four.

The North East Horn

The North East horn, manufactured by the North East Electrical Co., Rochester, N. Y., now being offered to the trade, is electrically operated. The motor, which drives it, is small and compact but powerful. The construction of the armature insures against stopping on dead center. The ground armature shaft runs in wick lubricated bronze bearings.

The feature of this horn is its adjust-



North East Horn

This is an electric motor-driven horn, which is constructed so as to give dependable and enduring service

table tone which, in spite of its volume and carrying power, gives forth a warning that is of a pleasing sound. Permanence and enduring quality of tone is assured. The diaphragm is constructed of special fatigue resisting crucible tool steel. It retails at \$16 complete with bracket, push button and wire.

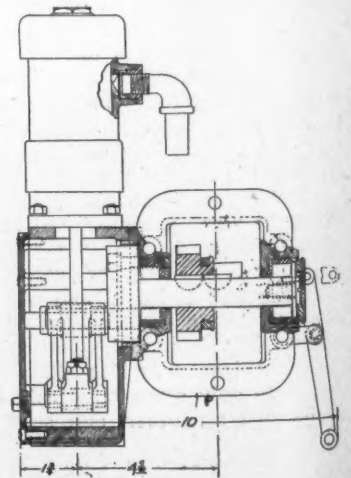
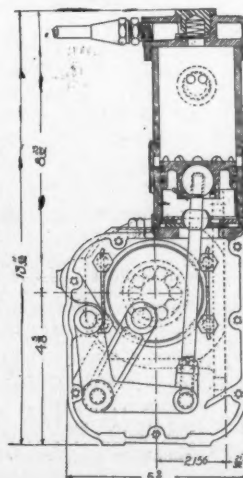
Truck Tire Compressor

Simplicity is the keynote of the design of the new model MT, long-stroke, transmission-driven, truck-tire pump, product of the Motor Starter and Air Pump Co., Book Bldg., Detroit, Mich. It contains few working parts; in fact, the manufacturer claims, through the elimination of excess units and the utilization of the single cylinder and compound stroke, the volume of air is increased, complications lessened and the size of unit reduced. This pump is designed to operate at the normal speed of from 650 to 750 r.p.m., but can be operated at a speed of 50 per cent. in excess of this if necessary.

The long or compounded stroke, one of the features of this pump, is accomplished through a multiplication of motion obtained through the use of links, which do not increase the size of the crankcase. The almost straight up and down movement of the piston rod is said to preclude cylinder wall wear and to eliminate the necessity of lubrication. Also the sliding piston ball eliminates

Long Stroke Truck Tire Air Compressor

It is designed to meet the requirements of high pressures and is capable of pumping up a 48 by 12 in. pneumatic tire to full pressure.



cramping between the piston and cylinder wall.

Two distinct sets of air intakes are provided, a main intake pipe and an auxiliary supply through twelve ports in the cylinder. The pump is protected against the ingress of foreign matter by fine brass mesh screens attached at the mouth of all air intakes.

Clearance in the head is practically eliminated; the adjustable piston rod compels the piston to come up even with the cylinder, leaving only the clearance that is in the head. Proper working temperature is maintained as at every stroke fresh air is drawn in and old air discharged. Besides, an expansion chamber provided in the head of the cylinder cools the air by sudden expansion.

Roller bearings are used throughout. The crankcase and gear box are constructed integral. All parts except the piston operate in a bath of oil, lubrication being furnished by splash.

The attachment of this pump is designed primarily for application to the transmission power take-off S. A. E. mountings, but it can be attached to the propeller shaft. With this compressor is furnished 6 ft. of copper tubing, 12 ft. of rubber hose, air gage, air chuck and other necessary couplings.

Sizes: Model ST has a bore and stroke of $2\frac{1}{2} \times 2\frac{3}{4}$ in., respectively, and inflates tires up to and including 40 x 8 in. Model MT has a bore and stroke of $2\frac{3}{8} \times 3\frac{3}{8}$ in., respectively, and inflates tires of sizes 42 x 9 in. and above.

Chain Coupler

The Clamert Mfg. Co., Pittsburgh, Pa., is offering a unit that will quickly replace lost links in an anti-skid chain. It is known as the Clamert chain repair coupler and is made of case-hardened steel.

This repair coupler is attached in the following manner: Manipulate the tumblers, which are really two disks that can be revolved independent of each other in any direction, but securely held within and movable in a back and forth direction parallel to the sides of the link, so that the notches in each disk register with each other, thus forming a slot at the gap in the coupler. Then insert the broken chain in the long end of the coupler first. Following this the disks are again registered, but on the other side of the gap to receive the other end of the chain in the short end of the coupler. When both ends of the chain



Clamert Chain Repair Coupler

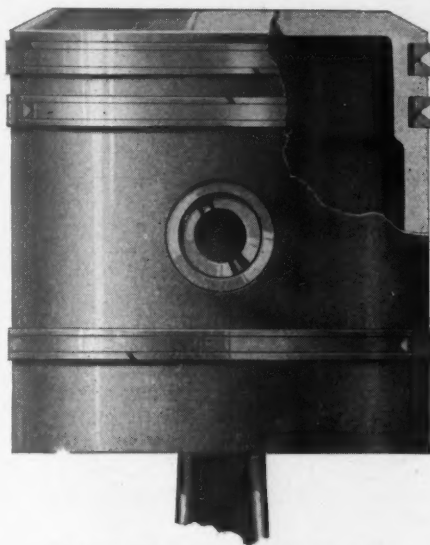
are linked together turn the tumbler or notched disks into the locked position.

These couplers are packed in lithographed tin boxes, one gross to a box. They are a valuable addition to the repair box of any truck. The price is three for a quarter.

The V-Plex Three-Piece Piston Ring

The V-Plex piston ring, manufactured by the Krasberg Piston Ring Works, 536 Lake Shore Drive, Chicago, Ill., departs from the general principle of piston ring construction.

It is made in three pieces, two side or pressure rings, the insides of which are cut at an angle which when placed in the piston groove are opposed to one an-



V-Plex Three-Piece Piston Ring

other, forming a V shaped opening, into which the third or center ring is placed. This center ring is of a V shaped cross section and is merely a spacer, which when in actual work, forces the pressure rings against the side of the groove to entirely fill the groove and prevent leakage of oil or gasoline into the crankcase. The three parts are placed with the gap or open ends one third apart and around the periphery, so that two solid sections of the ring oppose the gap in the third section. When placed in the groove as explained with the open ends or gaps of the two pressure rings one-third of the periphery apart, the V-Plex ring exerts an even pressure against the cylinder wall, thus greatly preventing the cylinder from wearing out of round. The faces of the two pressure rings coming in contact with the cylinder wall are due to the angular sides of a narrow width, causing the ring to seat itself rapidly without the necessity of a long running-in period.

Cochran Pistons of Dow-Metal

The Cochran Piston Corp., Detroit, Mich., is manufacturing pistons of the new Dow-Metal, in standard and oversize sizes. This metal is now being produced in quantity by the Dow Chemical Co., of Midland, Mich. It is stated that Dow-Metal is far lighter than aluminum alloys

and nearly four times as light as cast iron. Tests are at the present time under way to ascertain its practicability for use in various parts of automobile construction, such as piston rings, connecting rods, castings, bearings, bolts, gears, etc.

This new piston alloy, composed chiefly of magnesium, has its source of supply in natural salt brine, which is pumped from the many wells operated by this company at Midland and Mt. Pleasant. It is stated that its machining quality is good and its tensile strength great.

Re-Nu-R Products

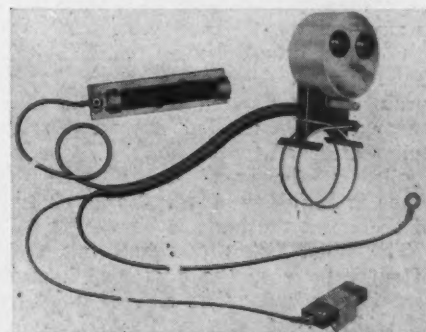
Following is a list of the uses to which the products known as Re-Nu-R, produced by the Re-Nu-R Products Co., 204-8 East Lake St., Minneapolis, Minn., may be put: Renewing leather, waterproofing leaky mohair tops, for rubber fabric tops, lining dye, top patches, top cement, canvas waterproofing, bow socket enamel, Ford car enamel, auto finish, clear finishing varnish, lamp and fender enamel, auto finish, clear finish and varnish, lamp and fender enamel, engine enamel (gray), white tire plating, rubber patch, radiator cement, valve compound, valve grinding compound, shellac, varnish and enamel, patching cement, metal polish. Each of the above listed products are stated by the manufacturer to be high grade, and to give satisfaction.

Rescue; a Storage Battery Device

A simple electrically operated device designed to control the charging of storage batteries, is being manufactured by the Resco Products Co., Jamestown, N. Y. It protects the battery against the danger of overheating by giving a warning and also provides a simple positive remedy.

The Rescue, as this device is known, consists of three units as follows: First, the thermostat, which is attached to a connector and held in place by a lead-plated spring clamp. Second, an indicator and controller switch, equipped with a red thermostat light and a green resistance light. The controller is mounted on the steering column directly in front of the driver. Third, a resistance unit, which is mounted on the dash under the hood, attached by two screws or two stove bolts.

Three wires leave the controller, marked Nos. 1, 2 and 3. The controller is



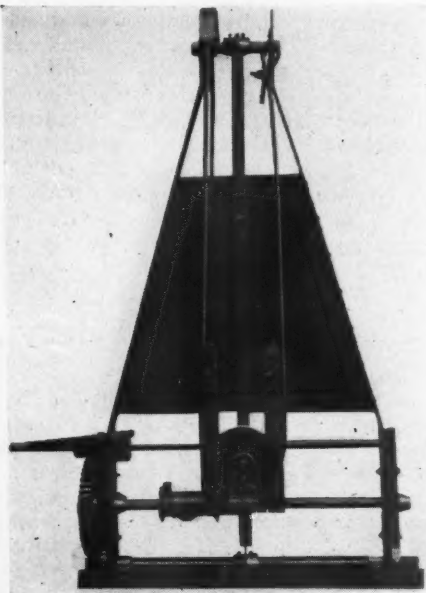
Components of the Rescue

grounded on the steering column through attaching clamp. Wire No. 1 connects to generator terminal of ammeter. Wire No. 2 connects to one end of the resistance unit and the other end of the resistance unit grounds to any metal part of the car. Wire No. 3 connects to the thermostat on the top connector of the battery.

National Hand Hoist

The National hand hoist, manufactured by National Steel Products Co., Kansas City, Mo., is a strong, compact and effective lifting device for attaching to the front end of dumping bodies. Although it has a lifting capacity with one man at the crank of 5 tons it is particularly recommended to a working capacity of 3 tons.

The frame is triangular in shape and formed from metal $\frac{1}{4}$ in. thick. Reinforcements and bracing on the frame



Manually Three to Five-Ton Hoist

makes the support for the attachment of the lifting cable at the apex of the triangle strong and rigid.

The pinion shaft is 1 5-16 in. diam. and extends through each side of frame as does the shaft carrying the cable drum. This arrangement is said to prevent misalignment and binding of the gears. Cast steel gears are used, having a gear ratio of $5\frac{1}{2}$ to 1.

A combined ratchet and brake is located on the pinion shaft. A pawl engages the ratchet and holds the hoist in any position of elevation.

Flexible crucible steel cable, $\frac{1}{2}$ in. diam. is used. This cable has a breaking strain of 7 tons and the load is lifted on two cables passing over a movable pulley attached to the body. The effort applied at the crank is multiplied 120 times in lifting the load. For each turn of the crank the body is elevated $1\frac{1}{4}$ in.

The hoist being compact, but 9 in. of space between the body and back of seat is required. One size of hoist fits all widths of trucks up to 42 in. wide, without any change. This important provision eliminates the need of carrying a

large stock of hoists to fit all makes of trucks. No part of the hoist extends below the truck frame, consequently no lifting arms interfere with the transmission, brake rods, etc.

A guide is attached to the hoist frame on which is mounted a steel casting carrying the lifting yoke and sheave. This guide keeps the hoist in perfect alignment with the body at all times.

The connection between body and hoist is a universal joint permitting the free movement of all parts, thus compensating for the twist of the frame due to the uneven condition of the ground.

Every ounce of pressure applied on the crank is used to lift the load and not to overcome friction occasioned by improper design. One pair of body hinges is furnished with each hoist, making the outfit complete at the list price of \$120.

Perfection Farm Electric Plant

The Perfection Unit electric light and power plant, manufactured by the Perfection Storage Battery Co., 508 East 40th St., Chicago, Ill., is featured because of its simplicity of construction. Accessibility is another point in its favor, as the entire engine can be dismantled in a short time and by removing the crankcase side plate every internal part is exposed to view. This plant operates with equal efficiency when using either gasoline, kerosene or alcohol as fuel.

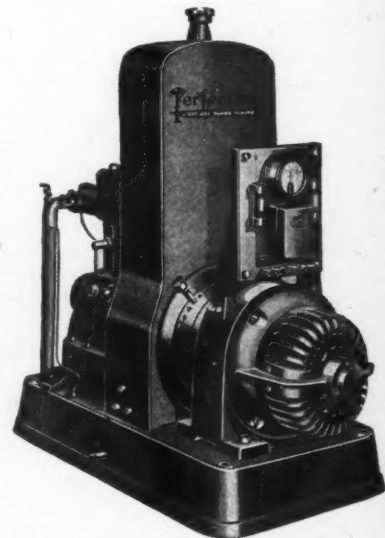
The engine is started electrically by closing the starting switch and just as soon as the generator acquires sufficient speed the battery is automatically charged. Opening the switch stops the engine. When the battery is fully charged or if it is being charged at a high injurious rate an automatic electric stop immediately shuts the engine down.

This engine is said to be able to simultaneously charge the battery and deliver belt power. If, however, most of the engine capacity is required for belt power the electric load may be reduced a few amperes, permitting 80 per cent of the engine capacity to be delivered in the form of belt power.

Provision has also been made in this plant in the event of the battery wire becoming loose or breaking against the engine running away by a special automatic stop.

Specifications: Engine, $3\frac{3}{4}$ in. bore and $3\frac{1}{4}$ in. stroke, rating 3 hp. normal speed, 1150 r.p.m., water cooled, L type motor governed electrically, and all castings of high-grade semi-steel; piston, hollow ground semi-steel with three high grade piston rings insuring perfect compression, drop-forged connecting rod with high-grade die cast babbit bearing; crankshaft, large drop-forged steel connecting rod of extra length, which insures smooth running and minimizes vibration, accurately counter-balanced and supported in extra long bearings; camshaft large and massive and cast in one piece; gears, time gears of hardened steel, one being integral with the camshaft, cut in helical form to insure absolute quietness and long wearing qualities; carbure-

tor is own make of exclusive design, functioning well on gasoline, kerosene or alcohol, draws its air through the crankcase, preventing leakage of oil through bearings and eliminating bad smelling fumes; lubrication, splash system, only one place to oil; fuel supply, fuel tank supported on crankcase arranged for suction feed to carburetor, meeting requirements of Board of Underwriters; cooling system, thermo syphon, water cooled; ignition, 32-volt jump spark, Electrical Specifications: Generator, 1200 watts, 1150 r.p.m. normal speed, ball bearing, guaranteed against defective workmanship and material for one year, form wound armature coils, large commutator, directly connected to crankshaft, wound for shunt operation while charging and compound with high torque for starting; switchboard bolted to top of generator, made of slate, a material approved by Board of Underwriters, equipped as follows: Zero center ammeter registering



Perfection Unit Light and Power Plant

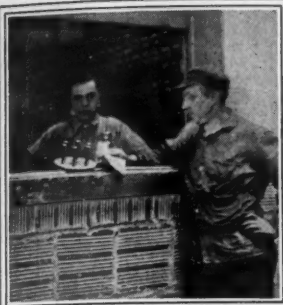
charge and discharge of battery; automatic cut-in and cut-out switch for generator circuit; automatic engine stop relay to stop engine when battery is fully charged or being charged at high injurious rate; combination engine cranking and ignition switch; generator and light fuses.

Battery, Perfection sealed in type, high efficiency, guaranteed for two years, sizes of plates for Type AA, 5 x 6 in., Type HH, $4\frac{3}{4}$ x 8 $\frac{1}{4}$ in.

Motorkool Oil

Motorkool oil has, according to the statement of the Motorkool Oil Co., Chicago, Ill., solved the problem of properly lubricating the cylinder wall.

It is pure paraffine base oil which is stated not to create any carbon. It is introduced into the gasoline (1 oz. to 5 gal.) and is carried with the vaporized gasoline into the cylinder, lubricating the cylinder wall. In the composition of this oil there is an ingredient which combines readily with carbon to form an inert gas. This gas passes out with the exhaust. It sells at \$2.50 per can of 32 fluid oz.



SERVICE AND REPAIR DEPARTMENTS



Conducted by C. P. SHATTUCK

Here's Service That is Different

THE "follow through" on the truck from the time it is received from the factory until it is in service with the purchaser, and thereafter seeing that it is properly serviced, coupled with a practical associate dealer policy, has placed the Ohio General Motors Company, Cleveland, Ohio, in the list of successful merchandisers of motor highway transportation.

The company has at its head, G. K. Wadsworth—known to his associates in the truck merchandising field as "Waddy"—who in entering the truck field applied sound business principles from the start. They must be sound for the writer mentioned his name to a number of truck dealers and the comment of all was the same: "If all competition was as clean as Wadsworth's, selling trucks would be a pleasure in Cleveland."

The fundamentals of successful merchandising of motor highway transportation are: Selling the work that the truck is to do; delivering a truck in first-class condition; giving service that satisfies, and seeing that the **DEALER ADHERES TO THE POLICIES OF THE DISTRIBUTOR.** The policy of "following the truck through" is not new. It is practiced by many successful dealers or distributors, but too many do not **CHECK THEIR DEALERS TO SEE THAT THE CUSTOMER IS SATISFIED AFTER THE TRUCK HAS BEEN PLACED IN SERVICE.**

Starting the Truck Right

"Start the truck out right and keep it right," is a business slogan of the Ohio General Motors Truck Company. Every truck received is subject to a rigid inspection by the mechanics in charge of

this work. The first step is washing the chassis. When the company took over the building in which is combined the sales, service and store rooms, provision



G. K. Wadsworth
General manager, Ohio General Motors Truck Company, Cleveland

was made for a washstand with thoroughly up-to-date equipment. The floor is the usual cement with drain. The water is heated by electricity, the unit has a capacity of 120 gallons in 20 minutes, and there are three heating units. One or three may be used as desired, and one is sufficient to supply hot water for the washstand of the mechanics. There is the usual revolving overhead washer and other conventional equipment. On either side of the washstand are four lights contained in special reflectors and these are mounted on a carrier that can be raised or lowered as required to illuminate the chassis.

Inspect Each New Chassis

After washing, mechanics give the chassis a rigid inspection, tightening nuts and bolts, etc. The inspection report shown in an accompanying illustration is used and the mechanic makes a report on 29 components. The condition of each part is noted on the report, which provides for the model, chassis and engine number, date received and whether it was a drive-away, freight or boat delivery. The mechanic making the inspection signs the record, as does the inspector, and the foreman or superintendent, is also obliged to O.K. the report. This provides a complete check on the inspection personnel. Space is left for remarks.

The inspection report serves a purpose other than seeing that the truck is right before delivery. It supplies the company a record of the condition in which the truck was received, and the record is valuable in the settlement of claims against the factory for faulty material, workmanship and assembly. The inspection provides



Entrance to Service Station and Showing Offices on Either Side

The last named slip is placed in an envelope and red and white sticker labels are employed. Size of order sheet, 11 x 8½ in.

and then the truck. If a sub-dealer so desires he may work with a salesman of the company in and around Cleveland; that is, accompany the salesman and note his methods of merchandising and analyzing transportation problems.

Must "Follow Through"

Every effort is made by Mr. Wadsworth and his associate executives to sell the new and young dealer on the need of sound and stable business methods in selling and servicing the truck. The young dealer is shown that he must "follow through" the sale to its use and maintain a constant supervision over the truck so that it will not only remain sold, but sell another to the owner's acquaintances or business friends. These policies are being practiced and improved from time to time, for Mr. Wadsworth realizes that it takes time, effort and money to build a distributing organization.

Once the heads of the various departments gather in conference and exchange ideas and, according to Mr. Wadsworth, they are frequently lively, for these attending are encouraged to call a spade a

spade. As a result of the free discussions many wrinkles have been ironed out. Every salesman is on a salary and commission basis and all employees are insured at the expense of the company. Mr. Wadsworth believes that service cannot be rendered the truck user unless the service station is equipped with time and labor-saving machinery and equipment. The initial investment was about \$9,000 and new machinery is added as the occasion requires.

While used trucks are taken as part payment, the allowance price is determined after a thorough inspection by the mechanics and the allowance is that for which the truck can be disposed of readily. Policies such as these are not only bound to result in success from a financial standpoint, but it will also tend to restrain the enthusiastic salesman, who, naturally, is anxious to close a contract, from making a rough estimate. This is a practice that has cost the dealer many an unnecessary dollar. The system followed by Mr. Wadsworth, however, eliminates this possibility by eliminating the

salesmen entirely, as far as the establishing of a price for trade-ins is concerned. And, furthermore, after the price has been established there is no further allowance made, even if the salesman pleads it will assure him the contract or sale.

Is Optimistic as to Sales

Mr. Wadsworth is decidedly optimistic as to the future of the truck industry and is among those distributors who set their house in order before the present conditions existed. He is selling trucks today and reports a good business, although other dealers in Cleveland are pessimistic. But Mr. Wadsworth says that the truck dealer from now on, particularly at present, must be on the job and watch his step. "This is no time for golf, hunting or other amusement for the dealer," said he. "Sales can be made, but there is this difference. Yesterday trucks sold themselves, but today and tomorrow and the days thereafter require that we must sell the work the trucks do and see that they stay on the job and give the owner the service that makes for satisfaction."

Approved Factory Methods for Disassembling, Adjusting and Reassembling Model 7000 Herschell-Spillman Engine

THE following are the approved factory methods of disassembling, installing new components, adjusting and reassembling the Model 7000 Herschell-Spillman 4-cylinder engine, having a bore and stroke of $3\frac{1}{2} \times 5$ in., which unit is produced by the Herschell-Spillman Motor Co., North Tonawanda, N. Y. This engine is standard with a number of truck manufacturers.

The directions given herein are for a complete overhaul or rebuilding job, but no instructions are given for disconnecting the various linkage necessary to the removal of the power plant from the chassis or for detaching the clutch or transmission. Neither are directions outlined for removing the engine starter, generator, magneto nor other ignition equipment nor for grinding valves, scraping and fitting bearings, etc., conventional work with which the mechanic should be familiar. Attention is directed to the various illustrations of the components of the engine, both unit assembled

and disassembled and these bear the factory part name. Use is made of the factory part name throughout and orders for new parts should bear the factory part name as well as the symbol number, part number and required number. The model of the engine, 7000, should also be given.

The complete overhaul of the engine will be facilitated if a Herschell-Spillman engine stand is employed. It is of the revolving type and will greatly reduce the labor charge to the customer. After placing engine in stand and in normal position **remove the casting on the top of cylinder head** to which the radiator hose is connected by **displacing nut and removing stud nut gasket**. Next **remove the cylinder head**. It is secured to the block by 14 studs and nuts. A copper asbestos gasket is employed. Use the lugs on each side of the head and end to remove the head and not a screw driver else the gasket will be damaged

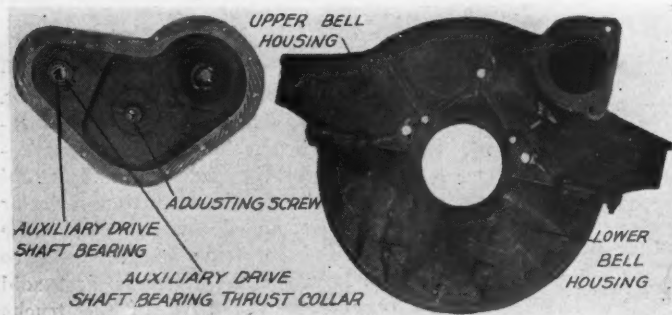


Front View of Herschell-Spillman Model 7000 Engine

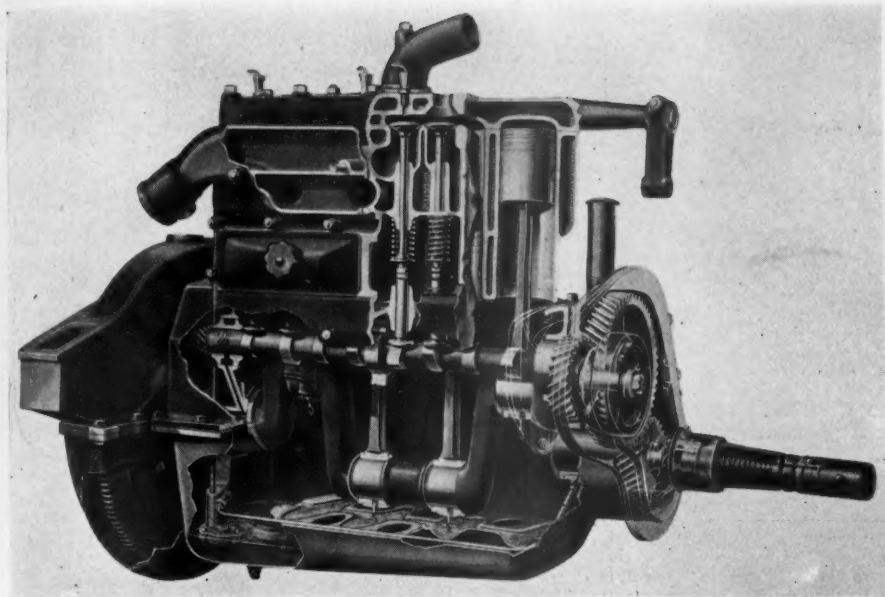
Also timing gear case cover, fan pulley, camshaft adjusting screw and starting crank assembly

and a new one will be necessary. It is assumed that the fan and belt have been displaced before the head is removed.

The valve carrier assembly, carrying the valve lifters, adjusting screws and lock nuts, is a separate casting, machined and is attached to the crankcase by cap screws. Alignment is obtained by taper pins. Unscrew and **remove hand wheels (2)** from cylinder side cover studs and **remove side covers (2)** from studs. The intake and exhaust manifold, a unit, need not be displaced. The easiest and quickest way to remove the valve carriers is to **release the valve springs**. The Herschell-Spillman valve tool, which is adjustable, is shown in



The Bell Housing is in Two Sections, and the Timing Gear Case Cover Carries an Adjusting Screw for Camshaft and Bearing for Auxiliary Drive Shaft



Phantom View of Model 7000 Herschell-Spillman Engine

an accompanying illustration and it is easily constructed. Remove the 14 5-16 in. cap screws retaining the carrier. Grasp two of the cross members of the carrier and pull it away from block. The taper pins will come away with the carrier.

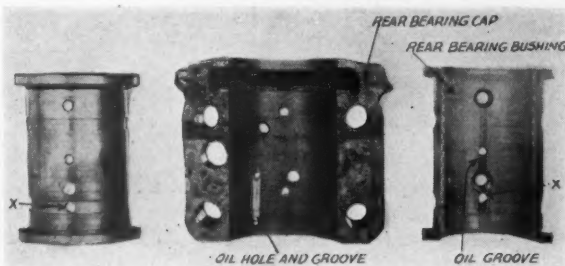
Removing Oil Pan

Remove oil plug from oil pan and drain oil. The pan is retained by seven cap screws and 16 bolts and in replacing it will be found that the cap screws are not long enough for the bolt holes and vice versa. Remove cap screws and bolts and remove oil pan, using caution to preserve the gasket. Clean pan. Lift out oil float. An oil pipe runs the length of the crankcase, from the pump at rear to the front main bearing. There are four holes in the pipe, one opposite each groove or trough in the pan. To remove oil pipe, disconnect at pump and bearings. Clean pipe with kerosene and make sure that the holes are clear. The oil pump will require no other attention than cleaning. To remove oil pump displace two cap screws and lift off. Immerse it in gasoline or kerosene and rotate the pump shaft with screw-driver blade, inserting tip of blade in slot of pump shaft. Clean and wipe dry the pump. Never attempt to alter the adjustment of oil pump, as it is correctly set at factory.

The bell housing (flywheel) is made in two sections, upper and lower. The upper half is bolted to the crankcase by three large bolts and the lower by two pins, assuring alignment and is secured to the upper half by six small bolts. Removal of housing is not necessary unless a crankshaft is to be removed, but with a complete overhaul it is best to displace both halves.

Remove cotter pins from connecting rod bolt nuts, remove nuts and lift off caps. Be careful not to damage oil splash tubes or dippers on caps. Remove connecting rods with pistons and replace caps on proper rods with shims

and catch nuts. The piston pins are of the fixed type, are locked in the piston boss by a cotter pin. The small end of rod is bronze bushed and the bushing is reamed to a push fit of the piston pin when fitting new bushings.



Showing Upper and Lower Rear Bushings of Crankshaft and Cap in Proper Relation to Each Other

In replacing the oil holes (X) and oil grooves or rings must align, fillet side of bearing must be inside the crankcase and plain or square end towards the timing gears

The lower ends (large) of the connecting rods are fitted with bronze shell, babbitt lined bushings or bearings in halves. The rods, pistons and cap ends are marked with a number on the valve side;

that is, when replacing, this number should face the valve side of the crankcase so that the oil splash tubes or dippers on rod cap will pick up oil. In adjusting or fitting connecting rod bearings adjust so that piston on rod will fall from an almost vertical position of their own weight. Do not adjust any tighter.

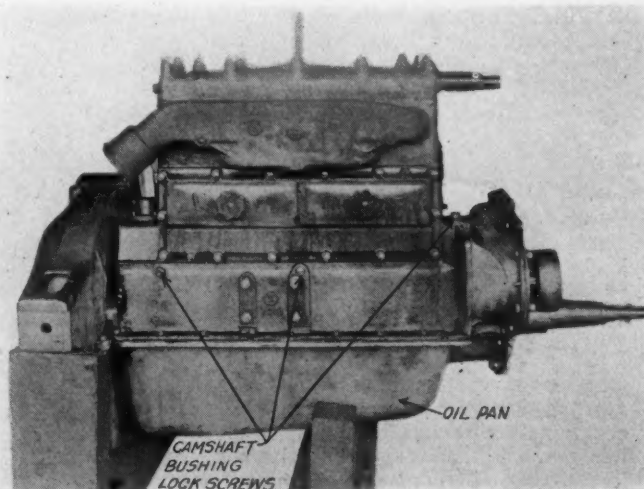
In the event the cylinder block is to be reground and oversize pistons and rings fitted use the pistons and rings supplied by the company which supplies pistons .0010 and .0020-in. oversize. Cylinders should be reground to conform to these dimensions. The main bearing caps (2) carry bushings or bearings of bronze, babbitt-lined. They are retained in the caps by screws well countersunk and in fitting new bushings see that screws are tight. Remove cotter pins from bearing studs, remove nuts and lift off bearing caps.

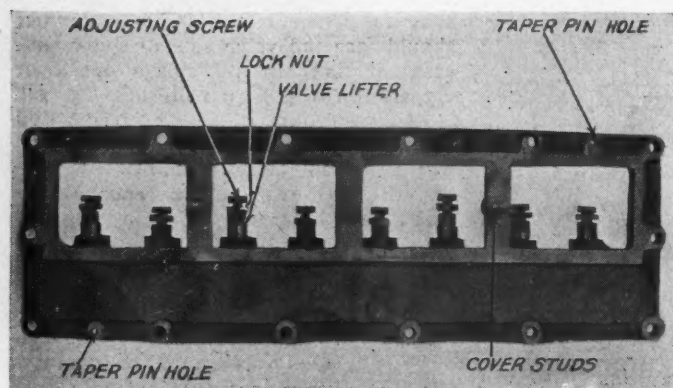
Removing Timing Gear Case Cover

Remove fan pulley before attempting to displace timing gear case cover. The pulley is mounted on a shaft carried in two bearings, runs at crankshaft speed and the shaft carries a gear in mesh with the timing gear. The fan pulley is keyed on with a Woodruff key and locked with a nut, cotter pinned. Remove cotter pin, lock nut and use a puller to remove fan pulley. The timing gear case is bolted to the front end of the crankcase by 15 bolts and there are two taper pins for aligning the cover with case. Remove the taper pins, nuts from bolts and grasp starting crank housing and rock up and down. This will start cover. Remove timing gear case cover and save the gasket. Lift crankshaft out of case.

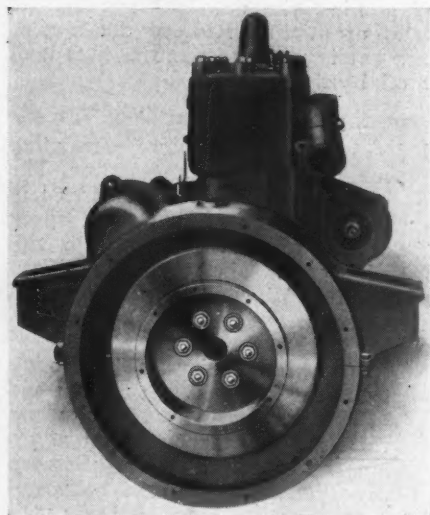
In the event the two bushings of the auxiliary driveshaft (fan pulley shaft) need replacing with new, remove drive shaft. One bushing is of bronze and can be driven out with a piece of hard wood, but brace cover with a substantial weight to prevent force of blows breaking the timing gear case cover. The outside bearing is accurately located by two dowels or pins and locked by four bolts. To remove outside bearings remove cap screws (4) on outside of case and drive out with wood as with other

The Camshaft Bushings or Bearings Are Locked by the Screws Indicated and These Must be Turned Out Before Attempting Removal of Camshaft.





The Valve Carrier Assembly is Attached to Crankcase by Cap Screws, and Two Taper Pins Assure Alignment



Showing Bell Housing and How Flywheel is Secured to Crankshaft.

bearings. This bearing is removed with the thrust collar, a hard fibre ring. Before replacing bushings both should be reamed to fit the shaft. Brace case when driving in bushings. One bushing has two oil grooves, one extending through to the oil ring and the other not quite through. The last named should be at top of case within normal position.

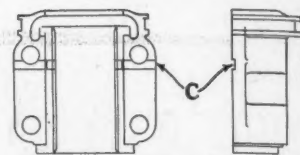
Removing Camshaft

The camshaft is carried in three bushings which are locked in the case by screws, the location of which are indicated by arrows in an accompanying illustration. One locking member is at the rear (valve side) of case and is shown with a plug. (The oil lead to dash is attached to this connection). The middle lock screw is in the center of the case and the third is on top of the case directly under fan stud or carrier. The camshaft is removed from the timing gear end of case and with the bushings or bearings. A special tool, which is illustrated, is used at the factory. The head or bent end (it is bent at right angles) is inserted between the timing gear and case and gear pried outward, but apply only a light pressure. Shift tool to a point directly opposite and pry. The rear camshaft bushing will start first, next the center and the rear or large last. After starting the rear bushing the others can be started by impact of the rear against the center, etc. **Remove camshaft with bushings.**

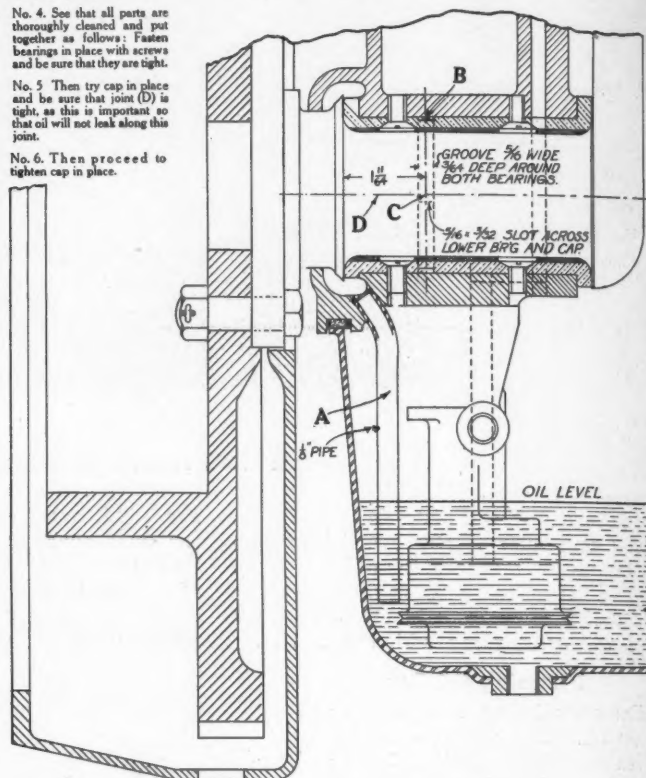
When new camshaft bushing or bearings are to be used proceed as follows:

INSTRUCTIONS

- No. 1. See that oil drain tube (A) is $\frac{1}{8}$ pipe and that lower end is submerged in oil as shown.
- No. 2. Have groove (B) turned around back of bearings $\frac{1}{16}$ wide, $\frac{1}{32}$ deep.
- No. 3. Have slot (C) $\frac{5}{16}$ wide $\frac{1}{32}$ deep filed across face of bearing and cap only.
- No. 4. See that all parts are thoroughly cleaned and put together as follows: Fasten bearings in place with screws and be sure that they are tight.
- No. 5. Then try cap in place and be sure that joint (D) is tight, as this is important so that oil will not leak along this joint.
- No. 6. Then proceed to tighten cap in place.



VIEWS OF BEARING SHOWING SLOT "C"

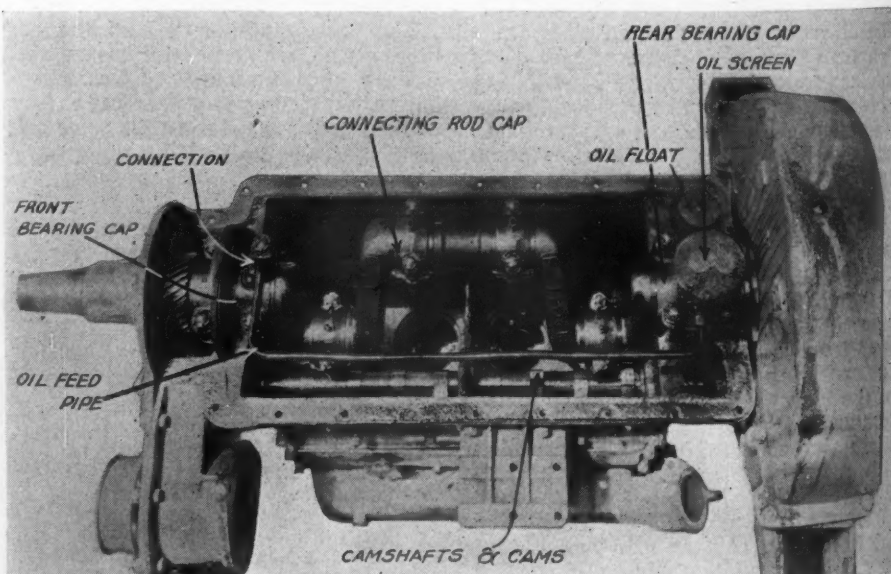


Longitudinal View of Crankcase, Showing How to Remedy Rear Bearing Oil Leakage

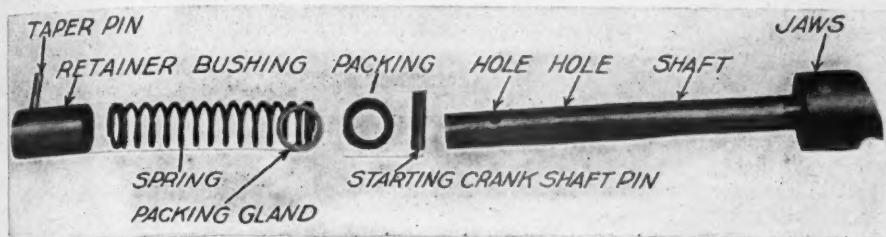
Drive out taper pin in the small spiral gear (oil pump drive shaft gear) and remove gear in arbor press. Slip front, center and rear bushings off the shaft, also thrust washer. Extreme care must be taken in replacing bushings. To reassemble camshaft components **replace** thrust washer and front or larger bushing, but make sure that hole in bushing is located as shown in an accompanying

sketch depicting the proper location of oil hole. Slip on center and rear bushings, but see that the taper or bevel of the rear bushings faces the small spiral gear. **Replace spiral gear and taper pin.**

Extreme care must be taken when replacing the camshaft to see that the oil holes in bushings align or register with those in the crankcase webs. And do not confuse the oil holes with those



Illustrating the Oil Tube Assembly, Oil Pump and Float and Main and Connecting Rod Bearings as Assembled



Showing the Starting Crank Completely Disassembled and the Parts Arranged in Their Order of Assembly

serving to lock the bushings, i. e., the openings for the lock screws. To replace camshaft, insert small gear end first, but not before the bushing is turned so that the oil holes align. Use a taper drift to align the lock screw hole in case with that in bushing. Insert center bushing and last the large or front bushing. If camshaft is replaced with crankcase inverted or bearing side uppermost, the oil holes in bushings should be underneath and lock screw hole at left when facing timing gear end from flywheel end. If camshaft is replaced with engine in its normal position the oil hole in bushing will be on top and lock screw hole at right. (See sketch illustrating proper location of oil hole.) Undersize or thicker walled camshaft bushings, .005 and .006 in. are supplied to replace worn. Replace the three screws locking camshaft bushings and tighten.

Remedying Rod Bearing Leaks

An accompanying illustration shows how to remedy rear main bearing oil leakage. First, see that oil drain tube A is a $\frac{1}{8}$ in. pipe and that lower end is submerged in oil as shown. Second, have groove B turned around back of bearings 5-16 in. wide and 3-64 in. deep. Third, have slot C 5-16 in. wide and 3-32 in. deep filed across face of bearing and cap only. Fourth, see that all parts are thoroughly cleaned and put together as follows: Fasten bearings in place with screws and be sure that they are tight. Fifth, then try cap in place and be sure that joint D is tight, as this is important so that oil will not leak along this joint. Tighten cap in place.

Installing New Timing Gear

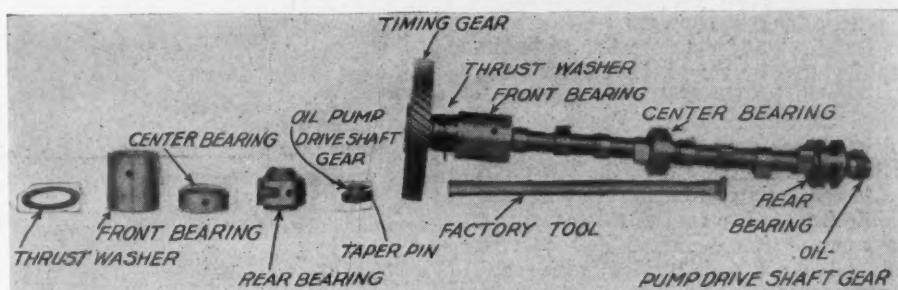
In the event the timing gear (camshaft) is damaged a new one is installed as follows: Remove wire from screws, remove screws and lock washers and slip off gear. It is a simple matter to correctly locate a new gear, as there is a number on the hub of the camshaft and a similar numeral on the hub of the gear. Simply see that numbers align. Replace lock washers and locking wire. Assuming that the crank shaft gear has

been damaged and a new one is to be used, drive out pin (starting jaw) and remove gear with an arbor press and use press to fit new gear. It is keyed on. In replacing gear make sure that fillet side is next to flywheel. The auxiliary or fan shaft gear is keyed on, a Woodruff key being used.

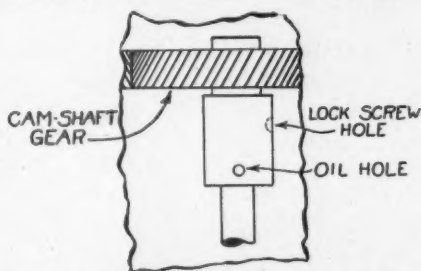
If the crankshaft has been reground undersize or thicker-walled bushings will

and rings must match or align. An accompanying illustration shows the rear main bearing cap with upper and lower bushings removed from the cap and case, respectively, and in proper relation to one another. In other words, if bushings and cap are replaced as shown they will be correctly located. In replacing the front bearing it is important that the fillet side of bearing be inside the case and plain or square end towards the timing gears. Unless this precaution be observed it will not be possible to pull the oil pan down tight and flush with the case. No directions are given for scraping or reaming or fitting new bearings. No shims with main bearings.

In replacing crankshaft in case the crankshaft gear and camshaft gear must be correctly meshed so that the factory timing of the valves will not be altered. To replace crankshaft, to time gears, turn camshaft un-



The Camshaft Completely Assembled is Shown at Right and With Bushings, or Bearings, Thrust Washer and Oil Pump Gear, Etc., in the Order They Should be Replaced on Camshaft. Note Factory Tool Used to Remove Camshaft.



In Replacing Camshaft Oil Holes Its Bushings Must Align With Those in Crankcase Webs

Sketch shows proper location of holes in case with engine in normal position when oil hole should be as indicated and lock screw hole at right. If case is inverted in stand the oil hole will be underneath and the lock screw at left when facing timing gear end of engine.

be required and these are supplied. Care must be taken in replacing the main bearings to see that the oil leads or holes align properly. In replacing bushings in the crankcase their surfaces or edges must be flush with the case not cocked. In replacing the rear main bearing the bushing must match, that is, the oil holes

til the number on gear and between two teeth is uppermost. Turn crankshaft until the number on a tooth of the gear (crankshaft) is in a position to align with number of camshaft gear. Lower the crankshaft into place, meshing the two gears and so that the numbers will register. Should it be essential to attach a new flywheel to the crankshaft proceed as follows: Turn crankshaft until the crank throws of Nos. 1 and 4 are in a vertical plane and turn flywheel so that marks 1 x 4 on its rim or periphery align with the throws. Slip on wheel on studs, tighten nuts and cotter pin.

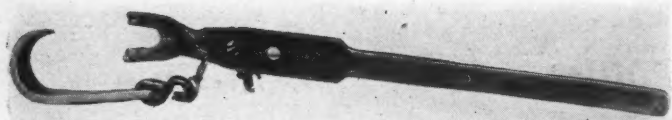
Starting Crank and Ratchet

The manual starting crankshaft and ratchet are contained in a housing cast integral with the timing gear case cover. In the event of an accident resulting in breaking the case cover or starting crankshaft housing, a new one will have to be used. The starting crankshaft assembly will have to be disassembled. Drive out the pin (starting crankshaft) in retainer bushing (see illustration of assembly and drive out 5-16 in. taper pin in bushings. Push shaft back through housing. Remove spring, packing gland and packing. To reassemble, push shaft back through housing, slip on packing (felt), gland, spring, bushing and both pins. In replacing cover it is suggested that the ratchet or dog be moved into engagement with pin on engine crankshaft to see if ratchet or jaw member aligns. Replace timing gear case cover.

No directions are given for the replacement of the connecting rods and



Showing the Connecting Rod Assembly, Piston Pin, Piston Pin Bushing, Lock Screw and Cotter



The Factory Valve Tool for Compressing Valve Springs.

pistons, flywheel housing, oil pump, oil float, oil tube, oil pan, etc. The space between the head of the adjusting screw in the valve lifter and end of valve stem should be readjusted, particularly if new valves have been used or valves ground. The space should not be less than .004 or more than .006 in. and the adjustment should be measured with a feeler gage. Adjustment is best made with engine warm.

In replacing the valve carriers it is

important that their holes align with those in the case and that the screws be tightened gradually and uniformly and that gaskets are in place. In replacing the cylinder head gasket grease both sides with ordinary cup grease and make sure that the bound edge of the gasket is down. Tighten the cylinder head nuts with the fingers, then use the wrench but tighten lightly at first. First tighten the nut on center stud then the two across on the head proper and in line with the

first nut. Next tighten the two rows next to the center nut, leaving the outside rows to the last. Go over the nuts in the same order, tightening each gradually. After operating the engine until it is warm, go over the nuts and further tighten them.

Lubrication

About five quarts of cylinder oil will be required to renew the oil supply after an overhaul, but sufficient oil should be used until the wire or gage registers with the mark F on the indicating gage. Oil should be strained before use and the old lubricant removed at least every 700 miles of operation during cold weather, the system flushed out with kerosene and new oil used.

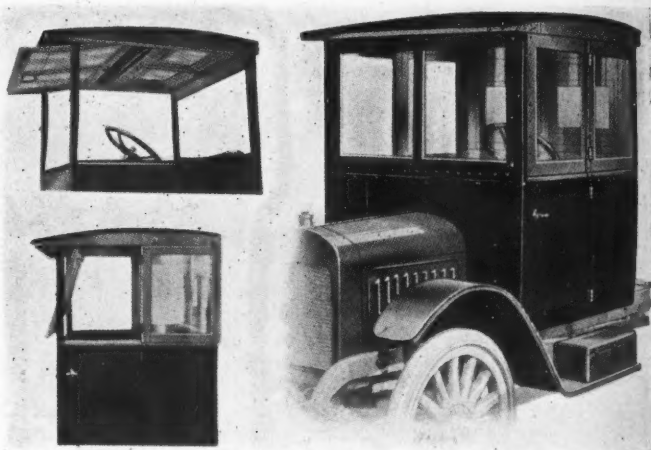
Babcock Universal Vestibule Cab

A new all-season cab that can be fitted to practically any standard truck chassis has just been added to the line of bodies manufactured by the H. H. Babcock Co., Watertown, N. Y. This new product is known as the Universal Vestibule Cab and has three main features which stand forth: The adjustable seat, the one-piece, double-ventilating windshield and the flexible front. The roof of this cab has a heavy wood frame slatted and covered with oil duck and banded with steel mounting. The upper rear panel can be fastened against the underside of the top and has two large windows. Doors are in two sections, the lower steel paneled inside and out, the upper with a full window.

The adjustable seat is a feature which allows the distance forward or backward

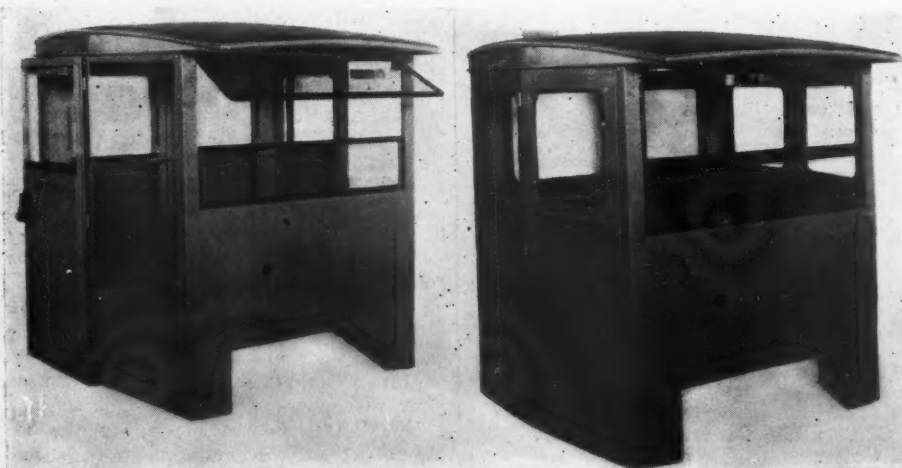
Babcock Universal Vestibule Cab

Features of this new cab are the adjustable seat, the collapsible windshield which can be flattened out against the roof of the cab, and the flexible front, which is designed to absorb the twist and weave of the chassis frame.



This New Model Cab Was Designed and is Being Manufactured by the Sheet Steel Products Co., Michigan City, Indiana.

It is made completely of steel, except the roof which is oak, bound with steel. The closed cab design has six disappearing type glass windows enclosed in special steel frames. These frames are blanked and formed into two halves that hold the glass against specially made rubber bumpers. The windshield is steel moulding construction, rain vision ventilating. As there are no nails or wood screws to come loose nor any wood framing to warp or check, rattles are said to be effectively done away with. Through proper embossing of the metal at different points, all drum has been eliminated. This cab weighs about the same as wood cabs and yet possesses a remarkable durability under vibration and weave.



1921 Luverne Express Truck Announced by the Luverne Motor Truck Co., Luverne, Minnesota.

The engine is a six-cylinder, $3\frac{1}{4} \times 5$ in., Herschell-Spillman Model 1100. Detroit Gear & Machine Co. unit type selective transmission. Torbensen internal gear rear axle having a final gear reduction of 8 to 1. Equipment consists of jack, tire pump and tool kit. The body is a combination stock and grain with option of platform stake body. The price, complete, is \$2750, plus War Tax. Additional information concerning specifications can be obtained in the specification columns of this issue.

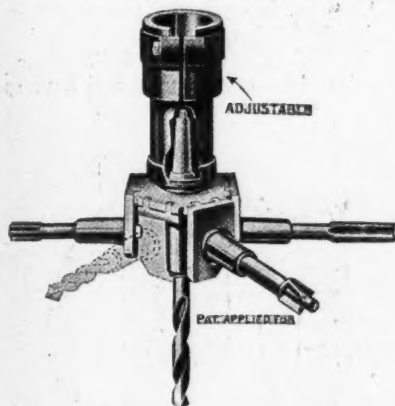
and up and downward to be regulated and the one-piece, double-ventilating windshield is hung on universal joints and can be opened and set at any angle or raised up against the roof. The front panels of the cab are spring steel and flexible so as to eliminate damage from wearing of the chassis.

Service Station and Repair Shop Appliances

Newman Repair Shop Products

The Newman Mfg. Co., 717 Sycamore St., Cincinnati, O., manufactures various tools designed to expedite repair shop work.

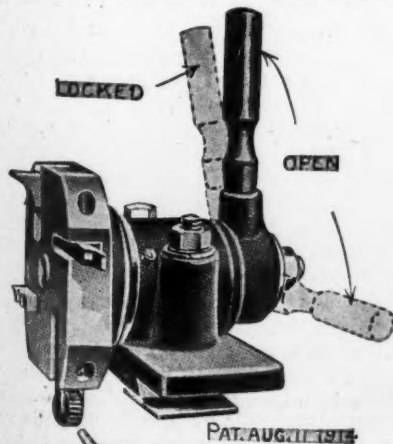
The main features of the Knurling tool, one of the Newman line, is that no pressure is exerted against the stock when the speed of the lathe is increased and that the chance of burning out the



Four-in-One Drill Head

Permits quick change from one tool to another by releasing a simple lock

tail stock centers is eliminated. This burning out hazard is eliminated because the tool passes over and around the work and does not direct the knurls against one side. This tool can be used on both light and heavy stock without the aid of a tail-stock center. The tool centers automatically after being set and oscillates freely to accommodate itself to wavy stock. Each tool is furnished complete with one set of standard knurls, cut, checkered, spiral and straight in fine, medium or coarse pitches. The pitch, which is measured from peak to peak, consists of either 32 fine cuts per in.; 20 medium cuts per in., or 14 coarse cuts per in. The knurls are fitted in case-hardened lugs and can be readily removed or exchanged. Adjustment is



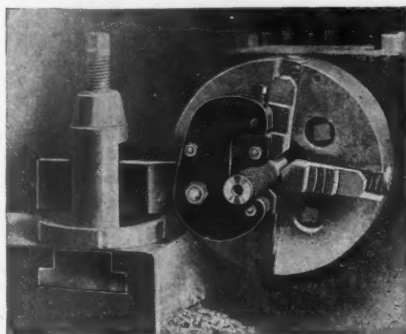
Tool Post Turret

This tool designed to increase production can be mounted on the tool post of any lathe

made by turning the screw at the top of the jaws. All parts are of wrought steel, properly treated and hardened. These tools with one set of knurls list at from \$5 to \$6.50.

Another time saving tool is the tool post turret, a device that is designed to increase production on engine lathes, an attachment which can easily be mounted on the tool post of a lathe of any style or size. This device brings any of four tools into instant action, without shutting off the power. The four tool pockets measure $\frac{5}{8} \times 1\frac{1}{4} \times 1\frac{1}{2}$ in. The head can be adjusted to any desired angle by loosening the rear screw at the top of the head. The price is \$75 net. Shipping weight, 23 lb.

The Grip-Tite is a device which grips the giant hand vise at any angle. The handle of the vise is easily inserted in the holder, a one-quarter turn of the adjusting lever opens the ball socket and permit turning the vise in almost any direction. Another quarter turn of the lever closes the ball socket securely, and clamps the vise rigidly at the desired angle. It can't slip, turn or twist out of position. All parts are



Knurling Tool

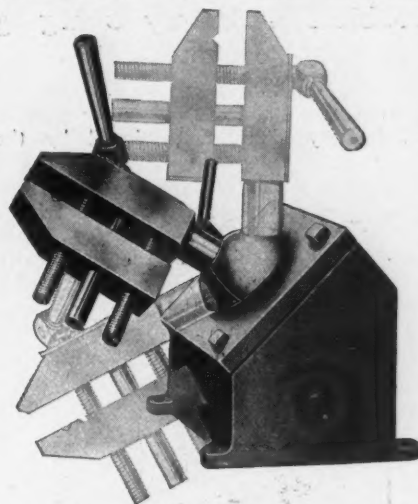
The tail stock of the lathe is not required in the operation of this tool

of wrought steel, nicely tooled and finished. The price is \$7.50 net. The price of complete combination, vise and Grip-Tite is \$15 net.

The Tail-Stock Turret is a rotary chuck accommodating five tools, and is easily attached to the tail-stock spindle of any lathe. The attachment is rigid and built extra strong to withstand a strain equal to that ordinarily subjected to the tail-stock itself. Once set, each tool automatically centers when brought into play. This device permits forming, roughing, boring, finishing, knurling, drilling, tapping, etc., without stopping the lathe or shifting belts when operations are changed. It is made in three sizes and ranges from \$40 to \$60 in price.

The patented changeable four-in-one drill head permits the change from one tool to another almost instantly by releasing a simple lock, which disconnects the drill in use. Another tool is then switched into place. The sleeve of this drill head is firmly clamped at the proper

height to the spindle, thus only the drill in actual use revolves while the drill head and other tools remain stationary.



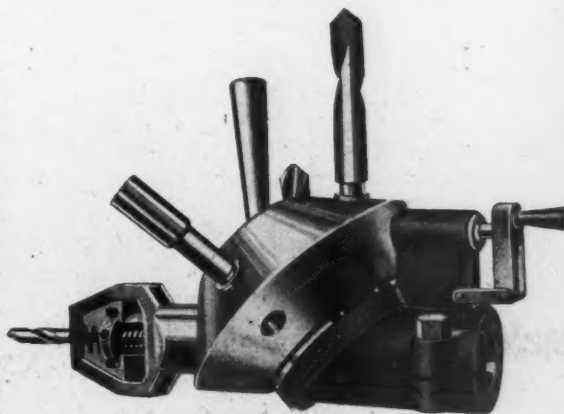
Grip Tite

With device a giant hand vise can be securely held at any angle. The ball socket is controlled by a lever

Timesaver Bearing Grinding Compound

Timesaver bearing grinding compound is used for producing a perfect surface on babbitt, bronze or lapping the bearing to the shaft itself. The manufacturer, the M. T. K. Products Co., 908 Alaska Bldg., Seattle, Wash., states that it does not cut iron or steel, charge or stick in the bearing metal, and that it does not operate in oil.

This compound eliminates the need of hand scraping, making the process mechanical by lapping to the shaft itself. It leaves the composition of the bearing metal unchanged and provides a uniform surface for the lubricating oil, or oil clearance, resulting in a perfect fit with a bearing, in which an unbroken continuous oil film carries the load, back-



Tail Stock Turret

It is a rotary chuck and accommodates five tools. With it all manner of work may be accomplished without stopping lathe or shifting belt.

ed by a uniform wall of babbitt. It is said to be free of abrasives or chemicals injurious to shafts, engine or any machinery if properly applied. It is put up in 6 and 12-can cartons, 144 cans to the case. Net price to dealers and garages is \$1.50.

Double EE Battery Charging Device

Among the new equipment offered to the trade for the Ford car is the Double EE Battery Charger, produced by the Double EE Co., 2309 Bosworth Ave., Chicago, Ill. This device allows the charging of a storage battery direct from a Ford magneto. It is an electrolytic chemical cell rectifier designed especially to meet the requirements of the Ford. It measures 5 x 7 x 3 1/4 in. and weighs 2 lb. and can be shipped by parcel post.

It contains no liquid, but must be filled with liquid before being used. This de-



Double EE Battery Charger

This device charges the batteries direct from the magneto

vice provides the direct current necessary for charging a battery, changing the current of the Ford magneto from alternating. The maker states it needs no attention in the way of adjusting repairs for renewing, but needs simply an occasional refilling with distilled water. The price of this charger is \$5.

Battery Charging Outfit and Motor Generator Sets

The Superior Engineering Co., 332 Third Ave., Pittsburgh, Pa., is the manufacturer of a new battery charging outfit and motor generator set.

The battery charging outfit is belt-driven and designed for use where A. C. current is not available. In the accompanying illustration the Type X set is shown. It charges from one to five 6-volt batteries, which is large enough for the average size garage. It requires only 1/2 hp. for operation and may be connected by belt to a line shaft or gas engine. It can be used to furnish a few lights. The list price is \$59.

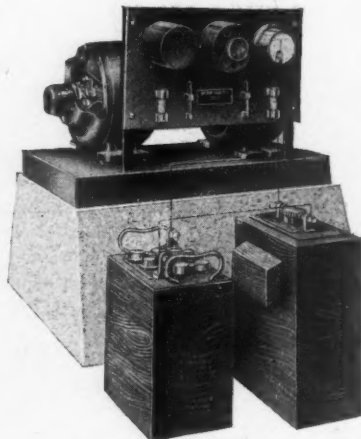
Motor generator sets of various capacities are produced for garages where



Battery Charging Set

For use where A. C. current is not available. It is belt driven.

A. C. current is available. The set shown herewith has a capacity of one to six-volt batteries. The motor is for 110 volts, 60 cycle, single phase current. The switchboard is equipped with reverse cur-



Motor Generator Set

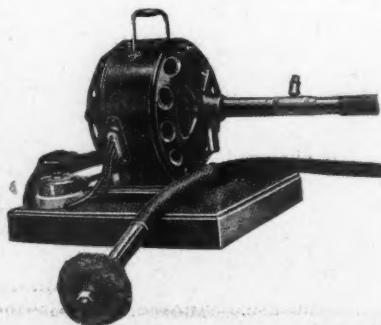
It has a capacity of from one to five six-volt batteries

rent relay which opens if the A. C. power fails. When power comes on again the set starts to charge automatically. This outfit is complete and ready for operation. The list price is \$140. This company also produces belt-driven farm lighting plants and 32-volt motors.

Portable Grinder and Polisher

The Portable grinding and polishing outfit, manufactured by the Webb Mfg. Co., Newark, N. J., is especially adaptable for garages and machine shops, where a light machine for drilling, buffing, polishing and grinding is needed.

It consists of the standard Webb shafting with leather-covered steel casing, and spindles for emery wheel or buff



Webb Machine for Drilling, Buffing, Polishing and Grinding

and for connection to power. A portable motor, equipped with a handle, hardwood platform and casters, complete the outfit. It is light enough to be moved about easily and yet strong enough for heavy work.

HusKee Electric Hand Drill

A new electric hand drill which will accommodate drills up to 1/2 in. is being manufactured by the Stenman Electric Tool Co., 42 Southbridge St., Worcester, Mass. Among the features of the drill are the Cutler-Hammer lightning switch which gives good control, and the use of Norma ball bearings throughout.

The 3/8 in. face gears are made of a special hardened gear steel. The gear shafts, another feature of this drill, rotate in phosphor bronze bearings and have special oil plugs to each bearing.



HusKee Electric Drills

Claimed to handle most of the work in a repair shop. It is a standard 1/2-in. drill

The handle of this drill is a combination of spade handle and breast plate. It is not necessary to detach the handle or breast plate when extra pressure is required. This drill comes complete with plug for connection into any alternating or direct current. The standard model is operated from a 110 volt circuit.

Wakefield All-Steel Wrenches

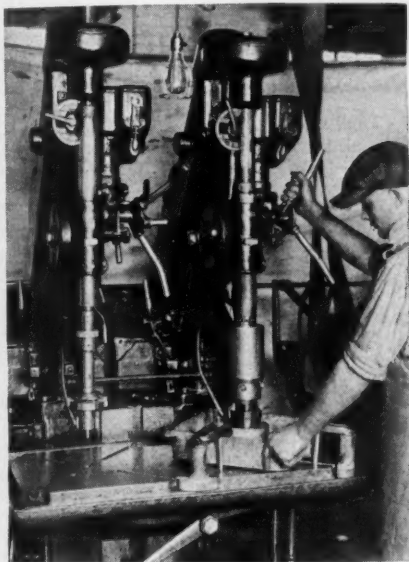
The Wakefield line of wrenches offers a complete variety, being adapted among other things for use on the truck, tractor or in machine shop. Each one is made entirely of steel. There are no screws to get out of place and the knurl guard feature is protected so that the user cannot lose the adjustment. This guard is made of a solid piece of steel in the jaw. No. 3 is 5 1/2 in. long, opens 1 1/2 in., jaws 3/4 in. thick, weight 5 1/2 oz. No. 3 Tire Lever: Length, 6 in., opens 1 1/2 in., jaws 3/4 in. thick, weight 5 3/4 oz. No. 19: Length, 9 in., opens 2 1/2 in., weight 16 oz. List price: No. 3, polished and mottled, \$.46; No. 3 polished and nickel, \$.57; No. 3 T. L. polished and mottled, \$.50; No. 3 T. L. polished and nickel, \$.66 and No. 19 polished and mottled, \$.66. It is manufactured by Clarence E. Wakefield, Worcester, Mass.

Barnes Gang Drill

The Barnes Drill Co., 814 Chestnut St., Rockford, Ill., offering to the automotive trade a drill known as the Barnes Gang Drill, which is especially adaptable to the needs of large service stations and factories. The self-oiling, 24-in., 2-spindle-box column gang drill with an oil pump attachment is the most popular design. This size drill has the following capacities:

A 1 3/4-in. high speed twist drill can be driven up to its working limits; a 1 1/2-in. high-speed drill can be worked into steel at the rate of 3 in. per minute and into cast iron at the rate of 5 in. per minute. Work on 2-in. cast iron pipe tops is also included in its uses.

Eight-gear speeds and eight-gear shifts on each spindle, all independent of each other and all under control of the



Barnes Gang Drill

A 2-spindle, 24-in. self-oiling, all-gear gang drill

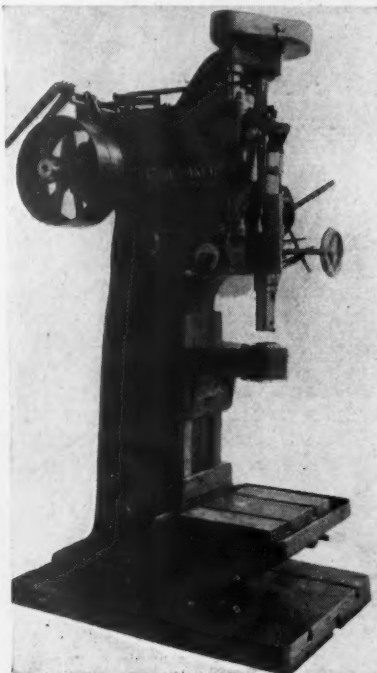
operator from the front of the machine, are provided on this machine. The transmission gears are cut from special chrome nickel, heat-treated and tempered steel, also all the gears and bearings throughout the entire machine are enclosed and oiled automatically. Through the utilization of gears in transmitting the power to the drill the cone is eliminated and with it the need for belts. For this reason possibility of slipping and shifting belts are unknown to this drill.

When desired a geared motor, of from 5 to 10 hp. dependent upon the size of and the number of spindles on the drill, is supplied.

Specifications for the 24-in. size drill is as follows: Height, 83 in.; distance, center to center of spindles, 20 in.; diameter spindles, double splined, 1 1/4 in.; Morse taper for spindle, No. 4; vertical travel of spindle, 14 in.; greatest distance, top of table to floor, 36 in.; size of table, planed surface (2 spindles), 17 x 40 in.; speed of tight and loose pulleys, 325 r.p.m.; size tight and loose pulleys, 14 x 4 in.; weight, net (2 spindles), 3550 lb.

Baker Cylinder Boring Machine

A cylinder boring machine having six speeds and twelve feeds with a boring capacity of 8 in. and 3 in. when boring in high is being made by Baker Bros., Toledo, Ohio. The six speeds, which are obtained through sliding gears operating



Baker Cylinder Boring Machine

It is known as No. 314 and is designed primarily for miscellaneous boring and drilling

on ball bearings, give a range of from 37 to 200 r.p.m. The twelve feeds furnished are from .018 to .096.

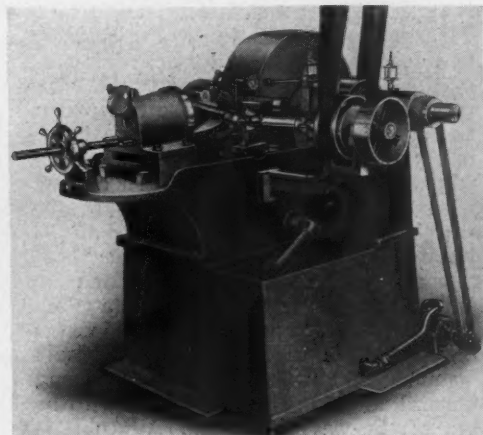
The boring bar support is adjustable vertically upon the table gibways. The feed rack and pinion are hardened alloy steel, the latter being cut directly on the shaft. The worm gear is of bronze and of large diameter and is so designed that the wear is uniform over the entire contacting surface. The feeding mechanism is protected against ignorant or careless operation by a safety shear pin. The forged high carbon steel spindle is fitted with special chrome ball thrust races, and the spindle nose is bored out of No. 5 Morse taper. The spindle nose is slotted across the end and fitted with a cross drift for driving and holding securely heavy tools. A hollow adjustable set screw arrangement to prevent small tools from dropping out is also provided in the nose.

New Stock and Accessory Bin

A new convenient size stock case, known as 54, for holding miscellaneous stock and parts so that they can be quickly found, is being produced by Hobart Brothers Co., Troy, O. It is sturdily built of oak and steel to withstand excessive weights and each compartment has a card holder describing contents. The compartments are 6 in. wide, 6 in. high and 6 in. deep. It may be used sectionally and additional units can be furnished as needed.

Sanford Precision Grinder

The Sanford model B precision centerless cylindrical grinder manufactured by the F. C. Sanford Mfg. Co., Bridgeport, Conn., consists primarily of a grinding wheel, run at regular grinding speed, and a feed wheel running in the same direction, but at much slower speed. Between the grinding and the feed wheel are located ways for guiding the work. The work is fed by hand or by gravity in a chute. It is not necessary to feed each piece individually. The main grinder is a 20-in. diam. 4-in. face wheel. The main shaft is of high carbon steel, heat treated, 3 3/4-in. diam. The bearings are located on either side of the driving pulley. The bearing next to the wheel is carried far into the hub of the grinding wheel in order to give rigidity. Sight feed oil cups are provided and these are supplied



Sanford Precision Grinder

A distinctive feature of the Sanford Grinder is the work rest and its relation to the grinding and feed wheels, permitting it to take heavy cuts and maintain accuracy. The main grinding wheel is 20 in. in diameter with a 4-in. face.

mented by a packing of hard grease in the bearing recess, the function of which is to liquefy and lubricate the bearings in case a careless operator should neglect to open the oil cups.

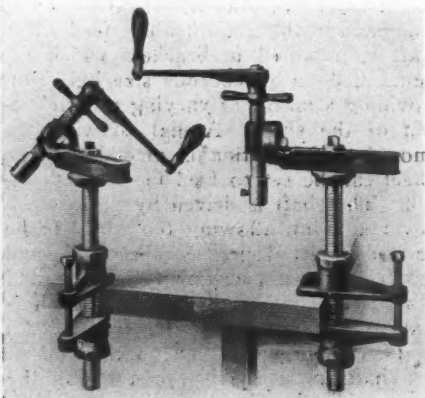
The carriage is dove-tailed into the main base and carefully scraped in place, gibbed for adjustment for wear. This carriage, which supports the feed wheel, is actuated by a capstan wheel carrying a nut which engages the screw operating on the feed wheel through double spiral springs. The capstan wheel carries a dial graduated in thousandths. The feed wheel shaft is mounted in brackets which are trunnioned on a generous size hub, thus providing a means of varying the inclination of the shaft. A dial showing the amount of inclination is provided. The wheel can be set to feed in either direction. The shaft is driven by means of a universal joint, allowing the wheel to be inclined at the desired feeding angle and still maintain a permanent position and location for the driving pulley which is held by a bracket to the frame. An auxiliary pulley is placed on the end of this shaft for use only when truing the wheels. The bearings are placed on either side of the feed wheel. This wheel, which is 10 in. diam. by 4-in. face, runs at a speed of about 48 r.p.m.

The frame is of the box type, massive design. It is provided with tank having a capacity of 8 gal., made in two sections—one for settling and one for supply. The flow of water is regulated by an angle valve in a convenient position for the operator. The truing device is hinged on a horizontal shaft bolted to the side of the frame and when not in use is swung back and along this shaft out of the way. The other end of the truing device has a solid rest on the frame and when in the truing position is absolutely parallel with the grinding wheel shaft. The two diamonds opposite each other are drawn across the faces of the two wheels with one movement, thus making the sides of the path of the work parallel.

The work rest is a cylindrical rod held in place in the work rest support. When it wears it is turned slightly and a new surface is presented to the work. This is repeated until a new rod is necessary. This rest and its relation to the grinding and feed wheels is a distinctive feature of the Sanford grinder and is the basic reason for its ability to take heavy cuts and maintain accuracy. The rest is set below the center of the wheels, so that when the wheels are brought in contact with the work, the center lines of the wheels are above the center line of the work. The work, being held from three almost equal points, cannot jump or whip and can only move endwise as dictated by the feed wheel. The work rest support is hinged to the horizontal shaft in the same manner as the truing device and is swung upward and along this shaft so as to be out of the way for truing. When it is returned to position it is absolutely parallel with the wheel spindle. It has a solid rest on the frame on the side away from the hinge. The work rest supports are of varying heights to suit different diameters of work. One of four sizes of rest supports is regularly furnished.

The Hunter Hand Drill

The Hunter hand drill, operated by a crank or ratchet, will drill at any angle. It is made in three sizes, accommodating drills from $\frac{1}{4}$ to $1\frac{1}{4}$ in. The spindle receives drills with a straight shank or Morse taper. They are made in the following models: The following is also a



Hunter Hand Drill

It is made in three sizes to accommodate drills from $\frac{1}{4}$ in. to $1\frac{1}{4}$ in.

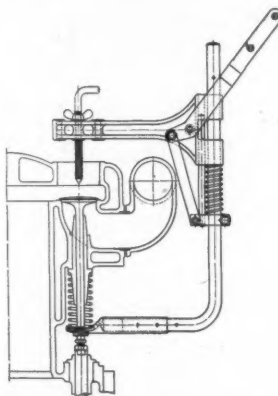
brief resume of specifications: No. 1 drills to $\frac{5}{8}$ in.; weight, 11 lb.; price with st. socket, \$20, and with Morse taper, \$22. No. 2 drills to 1 in.; weight, 26 lb.; price with st. socket, \$25; with Morse taper, \$28. No. 3 drills to $1\frac{1}{4}$ in.; weight, 53 lb.; price with st. socket, \$35; with Morse taper, \$39. They are manufactured by the James Hunter Machine Co., North Adams, Mass.

New Valve Lifter

The new valve lifter recently brought out by A. O. Feilbach, North Milwaukee, Wis., is a labor saving tool designed for use in the garage repair shops.

All the parts which make it up are steel except the head, which is malleable. The tool has one large and one small self-aligning shoe, made of steel hand-forged. The holes in the head through which the lifting bar slides are reamed and the shoe that is not in use is placed on the upper end of this bar and held there with small cotter pins, passing through the shoe and bar. Thus the parts are always kept together and there is no danger of their loss.

The head can be raised up and down by pulling a cotter pin and the shoes can be moved in or out and the adjusting



Sectional View of a New Valve Lifter

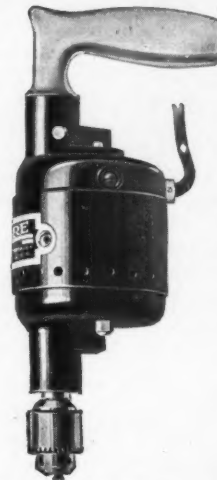
screw placed in corresponding holes with the shoes. A full movement of the lever holds down the valve, compresses the spring and automatically locks in position. This tool is made in two sizes, one for small cars, the other for large trucks and tractors.

The No. 3 tool is for large tractors and trucks and it sells at \$10. The No. 2 is a between size, selling at \$7.50. Nos. 2 and 3 are the tools for all-around service work.

Dumore Drills

The Dumore model 2-Ad sensitive drill is particularly useful for drilling small parts. It is fast on production jobs and greatly reduces drilling costs. This machine is furnished with the Dumore universal motor. Helical gears are used in the drive and the spindle is offset from center 25-32 in. The weight of the motor is counterbalanced by friction. Its equipment includes 10-ft. reinforced portable cord, plug, switch and chuck.

Specifications: Height 18 in.; weight 18 lb.; feed, rack and pinion; stroke, $\frac{3}{4}$ in.; in brass, aluminum and alloys, 0 to 13-64; drills to center of a $7\frac{1}{2}$ -in. piece; motor, Universal, operates on either D. C. or A. C. current; diam. $3\frac{3}{8}$ in.; ball bearing thrust; adjustable table, which may be



Dumore 1-Ad Portable Drill

This drill is specifically designed for the rapid drilling and countersinking of small holes

raised to any desired height within range and will swing entirely out of the way for drilling on the base; Jacobs' chucks regular equipment.

The Dumore 1-Ad portable drill is especially adaptable for the rapid drilling and countersinking of small holes. Its offset spindle permits the operator to drill at any desired angle into corners and other inaccessible places. It has a helical gear drive, the high-speed drive shaft and gear being one piece. The gears are hardened and ground. It is compact, light and handy, weighing but $4\frac{3}{4}$ lb.

Specifications: Length over all, 10 in.; drilling capacity, steel, 0 to 3-16 in.; brass, aluminum and alloys, 0 to 13-64 in.; motor, Universal, operates on either direct or alternating current; diam. of motor, $3\frac{3}{8}$ in.; spindle, offset from center, 25-32 in.; drive, helical gears; handle, aluminum; complete with 10-ft. cord, plug, switch and chuck; Jacobs' chucks regular equipment. Both tools are manufactured by the Wisconsin Electric Co., Racine, Wis.

Morris Drills

The Morris 2, 3 and $3\frac{1}{2}$ -ft. radial drill, manufactured by the Morris Machine Tool Co., Cincinnati, O., is capable of pulling high-speed drills up to its capacity at their maximum speeds, as well as doing tapping, facing, counterboring, etc.

The column is made of semi-steel, ground to size and is supported by both a large ball bearing and roller bearing in the stump, where it is rigidly clamped. This construction permits the arm to swing with ease and when unclamped. Both column and stump are extra heavy, insuring rigidity.

The lower shaft in the stump on which the bevel gear is mounted runs in bronze bearings at both ends. The arm is designed to properly resist torsional and

(Continued on page 89)

Replacement Table. Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Brake Lining Sizes and Truck Frame Dimensions

[illegible]

Replacement Table—Continued

Name, Model, Tonnage and Year	ENGINE						BRAKE LINING						FRAME	
	Piston Rings			Carburetor			Service			Emergency			Length of Driver's Seat	Width
	No. per cyl.	Width	Outlet Diameter	Inlet Diameter	Length	Thickness	Length	Width	Thickness	Length	Width	Thickness		
Dependable E-2 1/2-1920.	4	1 1/2	1 1/2	1 1/2	152	1 1/2	152	33	1 1/2	152	33	1 1/2	152	33
Diamond T-2 1/2-1920.	4	1 1/2	1 1/2	1 1/2	123 1/2	1 1/2	123 1/2	34	1 1/2	123 1/2	34	1 1/2	123 1/2	34
Diamond T-3 1/2-1920.	4	1 1/2	1 1/2	1 1/2	132 1/2	1 1/2	132 1/2	34	1 1/2	132 1/2	34	1 1/2	132 1/2	34
Diamond T-4 1/2-1920.	4	1 1/2	1 1/2	1 1/2	145	1 1/2	145	37	1 1/2	145	37	1 1/2	145	37
Diamond T-5 1/2-1920.	4	1 1/2	1 1/2	1 1/2	143	1 1/2	143	37	1 1/2	143	37	1 1/2	143	37
Diamond T-6 1/2-1920.	4	1 1/2	1 1/2	1 1/2	156 1/2	1 1/2	156 1/2	37	1 1/2	156 1/2	37	1 1/2	156 1/2	37
Diehl A-1-1917-18-19-20.	4	1 1/2	1 1/2	1 1/2	90	1 1/2	90	53	1 1/2	90	53	1 1/2	90	53
Doane 2 1/2-1917-18-19-20.	4	1 1/2	1 1/2	1 1/2	126	1 1/2	126	58	1 1/2	126	58	1 1/2	126	58
Doane 3 1/2-1917-18-19-20.	4	1 1/2	1 1/2	1 1/2	146	1 1/2	146	64	1 1/2	146	64	1 1/2	146	64
Doane 4 1/2-1917-18-19-20.	4	1 1/2	1 1/2	1 1/2	168	1 1/2	168	78	1 1/2	168	78	1 1/2	168	78
Dodge Brothers 1 1/2-1917-20.	4	1 1/2	1 1/2	1 1/2	142 1/2	1 1/2	142 1/2	34	1 1/2	142 1/2	34	1 1/2	142 1/2	34
Dorris K-4 1/2-1918-20.	4	1 1/2	1 1/2	1 1/2	179 1/2	1 1/2	179 1/2	36	1 1/2	179 1/2	36	1 1/2	179 1/2	36
Dorris K-7 3/4-1919-20.	4	1 1/2	1 1/2	1 1/2	124	1 1/2	124	36	1 1/2	124	36	1 1/2	124	36
Double Drive B-3.	4	1 1/2	1 1/2	1 1/2	118	1 1/2	118	31	1 1/2	118	31	1 1/2	118	31
Douglas G-1 1/2.	4	1 1/2	1 1/2	1 1/2	118	1 1/2	118	31	1 1/2	118	31	1 1/2	118	31
Douglas H-2.	4	1 1/2	1 1/2	1 1/2	118	1 1/2	118	31	1 1/2	118	31	1 1/2	118	31
Douglas I-3.	4	1 1/2	1 1/2	1 1/2	132	1 1/2	132	31	1 1/2	132	31	1 1/2	132	31
Douglas J-3.	4	1 1/2	1 1/2	1 1/2	126	1 1/2	126	39 1/2	1 1/2	126	39 1/2	1 1/2	126	39 1/2
Duplex A-1-1920.	4	1 1/2	1 1/2	1 1/2	121	1 1/2	121	34	1 1/2	121	34	1 1/2	121	34
Duplex A-2-1920.	4	1 1/2	1 1/2	1 1/2	123	1 1/2	123	34	1 1/2	123	34	1 1/2	123	34
Eagle 100-2.	4	1 1/2	1 1/2	1 1/2	Opt	1 1/2	Opt	36	1 1/2	Opt	36	1 1/2	Opt	36
Elsworth 25A-1 1/2-1918-20.	4	1 1/2	1 1/2	1 1/2	60	1 1/2	60	30	1 1/2	60	30	1 1/2	60	30
Elmira C-1 1/2-1920.	4	1 1/2	1 1/2	1 1/2	120	1 1/2	120	30	1 1/2	120	30	1 1/2	120	30
Fagel 1 1/2-1917-20.	4	1 1/2	1 1/2	1 1/2	135	1 1/2	135	37 1/2	1 1/2	135	37 1/2	1 1/2	135	37 1/2
Fagel 2 1/2-1917-20.	4	1 1/2	1 1/2	1 1/2	161 1/2	1 1/2	161 1/2	37 1/2	1 1/2	161 1/2	37 1/2	1 1/2	161 1/2	37 1/2
Fagel 4500-1917-20.	4	1 1/2	1 1/2	1 1/2	161 1/2	1 1/2	161 1/2	37 1/2	1 1/2	161 1/2	37 1/2	1 1/2	161 1/2	37 1/2
Famous B10-1-1919-20.	4	1 1/2	1 1/2	1 1/2	94	1 1/2	94	34	1 1/2	94	34	1 1/2	94	34
Famous B12-1 1/2-1919-20.	4	1 1/2	1 1/2	1 1/2	132	1 1/2	132	33	1 1/2	132	33	1 1/2	132	33
Fargo 017, P18-2, P19-2, P20-2.	4	1 1/2	1 1/2	1 1/2	112	1 1/2	112	34	1 1/2	112	34	1 1/2	112	34
Federal 1-1 1/2.	4	1 1/2	1 1/2	1 1/2	118	1 1/2	118	34	1 1/2	118	34	1 1/2	118	34
Federal 1E-1 1/2.	4	1 1/2	1 1/2	1 1/2	134	1 1/2	134	38	1 1/2	134	38	1 1/2	134	38
Federal UE-2.	4	1 1/2	1 1/2	1 1/2	154	1 1/2	154	38	1 1/2	154	38	1 1/2	154	38
Federal WE-3 1/2.	4	1 1/2	1 1/2	1 1/2	86	1 1/2	86	38	1 1/2	86	38	1 1/2	86	38
Federal XE-5.	4	1 1/2	1 1/2	1 1/2	124	1 1/2	124	23	1 1/2	124	23	1 1/2	124	23
Federal Light Duty.	4	1 1/2	1 1/2	1 1/2	124	1 1/2	124	23	1 1/2	124	23	1 1/2	124	23
Federal Heavy Duty.	4	1 1/2	1 1/2	1 1/2	136	1 1/2	136	36	1 1/2	136	36	1 1/2	136	36
Ford T-1.	4	1 1/2	1 1/2	1 1/2	108	1 1/2	108	34	1 1/2	108	34	1 1/2	108	34
Front-Drive C1 1/2.	4	1 1/2	1 1/2	1 1/2	121	1 1/2	121	34	1 1/2	121	34	1 1/2	121	34
F.W.D. B-3.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	36	1 1/2	144	36	1 1/2	144	36
Garford 26-1 1/2-1920.	4	1 1/2	1 1/2	1 1/2	150	1 1/2	150	32	1 1/2	150	32	1 1/2	150	32
Garford 70H-2-1920.	4	1 1/2	1 1/2	1 1/2	120	1 1/2	120	34	1 1/2	120	34	1 1/2	120	34
Garford 77D-3 1/2-1920.	4	1 1/2	1 1/2	1 1/2	120	1 1/2	120	34	1 1/2	120	34	1 1/2	120	34
Garford 77C-3 1/2-1920.	4	1 1/2	1 1/2	1 1/2	120	1 1/2	120	34	1 1/2	120	34	1 1/2	120	34
Garford 68-5-1920.	4	1 1/2	1 1/2	1 1/2	168	1 1/2	168	39	1 1/2	168	39	1 1/2	168	39
Garford 68-D.	4	1 1/2	1 1/2	1 1/2	131	1 1/2	131	34	1 1/2	131	34	1 1/2	131	34
Gary J-1 1/2.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gary J-2 1/2.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gary K-3 1/2.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gary M-5.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gersix K-2 1/2-1920.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gersix M-1 1/2-1920.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gersix L-3 1/2.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Giant 15-1.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Giant 17-3 1/2.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 10A-1 1/2-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 31A-1 1/2-1915-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 31B-1 1/2-1915-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 41A-2-1915-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 41B-2-1915-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 71A-3 1/2-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 71B-3 1/2-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 101A-5-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 101B-5-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
G.M.C. 101C-5-1916-20.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32
Gramm-Bernstein 15-1 1/2-1920.	4	1 1/2	1 1/2	1 1/2	144	1 1/2	144	32	1 1/2	144	32	1 1/2	144	32

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Pages Following

In All Specifications { O—Own Op or Opt—Optional

Engine:	FIN—Fin Tube ZZT—Zig Zag Tube	DD—Dry Disc Fr—Friction	Dit—Ditwiler Flex—Flexite	Sals—Salisbury Sav—Savage
Cont—Continental	GBS—Golden, Belknap & Swartz	Ignition System: Amr—American Swiss AtK—Atwater-Kent	KB—Kinsler-Bennett Mech—Mechanics	Shel—Sheldon S-Par—Stan-Par
Her—Hercules	HSp—Herschell-Spillman	AuL—Auto-Lite	M-E—Merchant & Evans Pet—Peters	Thom—Thomson Tim—Timken
LeR—Le Roi	Lib—Liberty	Ber—Berling	Sned—Snead	Torb—Torbensen W-M—Weston-Mott
LMF—Light Mfg. & Fdy.	Lyc—Lycoming	Con—Connecticut	Spic—Spicer	US—United States Walk—Walker
Rut—Rutenberg	Ster—Sterling	Del—Delco	Ther—Thermoid	Wis—Wisconsin
TC—Twin City	Vict—Victory	Eis—Eisemann	UP—Universal Machine	20
Wau—Waukesha	Wei—Weidely	Kin—Kingston	UP—Universal Products	Rear Axle (Type): Flot—Floating 1/2-Fl—Semi-Floating 3/4-Fl—3/4-Floating D—Dead
Wis—Wisconsin	Valve Arrangement:	KW—K. W. Ignition Co.	Bea—Beans	Steering Gear: CAS—C. A. S. Products Co Dit—Ditwiler Gem—Gemmer Jac—Jacox Lav—Lavine Ros—Ross War—Warner Woh—Wohlrab
H—Overhead	L—ELL-Head	Lor—Lorraine	Coop—Cooper	21
T—TEE-Head	S—Sleeve	POL—Prest-O-Lite	Del—Delany	Wheels: Arc—Archibald AuW—Auto Wheel Bim—Bimel Cla—Clark Day—Dayton Det—Detroit E&O—Eberly & Oris Hay—Haynes Hoo—Hoopes Brothers Jon—Jones Kel—Kelsey Mot—Motor Wheel Mut—Mutual Pru—Prudden Roy—Royer Rus—Russell Sal—Salisbury Sch—Schwartz Smi—Smith Sta—Stanwell StM—St. Mary Stn—Standard Wal—Walker Wan—Wayne W-L—Waterhouse & Lester Wes—Western Wheel Co
How Cooled:	A—Air	Rm—Remy	GC—Garden City	22
C—Centrifugal	G—Gear Pump	Sim—Simms	Har—Harvey	Rim Equipment: Bak—Baker Det—Detroit Fir—Firestone Gdy—Goodyear Jax—Jaxon Kel—Kelsey Sta—Stanweld
T—Thermo-Syphon	Radiator (Make):	Wag—Wagner	Hig—Higgins	23
BW—B & W	Brn—Brenem	Wes—Westinghouse	IC—Iron City	Final Drive: B—Bevel Gear C—Chain I—Internal Gear N—Concentric Spur P—Spur R—Double Reduction S—Spiral Bevel W—Worm
Bu—Bush	Can—Candler	Engine Starter:	Lah—Laher	Rear Axle (Make): Badg—Badger Col—Columbia Stan—Chicago Cl—Clark Emp—Empire Hind—Hindley Ir.M—Iron Mt. Keno—Kenosha Ken—Kennedy Rock—Rockford Russ—Russell
Chic—Chicago	EM—English-Mersick	AC—Allis-Chalmers	Mar—Marcmont	17
Eur—Eureka	Fed—Fedders	AL—Auto-Lite	Math—Math	18
Flex—Flexo	GO—G. & O.	Bj—Bijur	Mer—Merrill	19
Har—Harrison	Hoo—Hooven	DL—Delco	Nat—National	20
Idl—Ideal	Jam—Jamestown	Dy—Dyneto	Pen—Penn	21
Kue—Kuenz	Liv—Livingston	GD—Gray & Davis	Per—Perfection	22
Lang—Long	McC—McCord	LN—Leece-Neville	Row—Rowland	23
May—Mayo	Mod—Modine	NE—North East	Shel—Sheldon	24
Per—Perfex	R-T—Rome-Turney	RE—Remy	SP—Spring Perch	25
R-T—Rome-Turney	Spar—Spartan	Wg—Wagner	Stan—Stan-Par	26
Spec—Special	Spli—Splitex	USL—U. S. L.	Ster—Sterling	27
Stan—Standard	Radiator (Type):	W—Westinghouse	Tem—Temme	28
C—Cellular	H—Honeycomb	Gearset:	Tut—Tutill	29
PT—Plain Tube	WD—Wet Disc	B-Li—Brown-Lipe	US—United States	30
		Cott—Cotta	Wis—Wisconsin	31
		Covt—Covert	Final Drive:	32
		D-Sea—Driggs-Seabury	B—Bevel Gear	33
		Det—Detroit	C—Chain	34
		Dun—Dundore	I—Internal Gear	35
		Durst—Durst	N—Concentric Spur	36
		Full—Fuller	P—Spur	37
		G-Le—Grant Lees	R—Double Reduction	38
		MM—Mechanics Mach. Co.	S—Spiral Bevel	39
		Munc—Muncie	W—Worm	40
		Rock—Rockford	Rear Axle (Make):	41
		Warn—Warner	A—Amidships	42
		Location of Gearset:	R—Rear	43
		U—Unit with engine	U—Unit with jackshaft	44
		Universal:	A-B—Easton Mch. Co.	45
		A-B—Easton Mch. Co.	Acm—Acme	46
		Arv—Arvac	Bear—Bearings Co.	47
		Bid—Blood Brothers		48

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Truck Frame Dimensions Are Included in Replacement Table

(Where prices are not given it is because we have been unable to get them from authoritative sources)

* An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEAR SET		REAR AXLE		Steering Gear	TIRES, WHEELS, RIMS		Chassis Weight	Wheeltbase	P. Cent of Weight on Rear Wheels																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
		Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrange't	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)		Ignition System	Engine Starter				Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear	Front	Rear	Wheels (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Dodge	1085	Own	3 1/2 x 4 1/2	24	L	C	McC	PT	PT	FS	Stew	V	Mon	Own	DD	Own	NE	Own	Own	Own	U	U	3	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET			REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	Pr. Cent of Weight on Rear Wheels										
		Bore and Stroke	N. A. C. C.	Horsepower	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter		Make	Location				Speeds	Universal (Make)	Springs (Make)	Final Drive	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Wheels (Make)	Rim Equipment	
1	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94	
*Giant 15.....	2425	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*GMC 31A.....	2495	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Graham Bros Speed Truck.....	2495	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Graham 10.....	1495	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Gramm Bernstein 15.....	2050	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Gramm Bernstein 65.....	2725	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Gramm 17A.....	2675	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*G. W. W. Farm Spec.....	2100	Wei	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Hahn CD.....	2550	Cont C4	4 1/2 x 5	27.2	22	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Harvey WEA.....	2650	Buda OU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Hawkeye K.....	2365	Buda OU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Higley B20.....	2500	Cont K4	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Higley 20A.....	3250	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*H. R. L. R.....	1875	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Huffman B.....	1875	Buda IU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Huffman C.....	2500	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Independent E (Low).....	2040	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Independent F (Ohio).....	2585	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*International K.....	2400	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Jumbo 15.....	2850	Buda CTU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kalamazoo G.....	3100	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kearns 1 1/2.....	2200	H-Sp 7000	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kelly-Springfield K31.....	3000	Own	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kelly-Springfield K34.....	3000	Own	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kiesel General Utility.....	2775	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Kleiber A.....	3100	Cont C4	4 1/2 x 5	27.2	22	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Larabee-Deyo U.....	2400	Wau BUX	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Luedinghaus W.....	2490	Wau BUX	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Macall A.....	2825	Cont C4	4 1/2 x 5	27.2	22	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Macall AB.....	3000	Own	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Macall B.....	3450	Own	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Master JW.....	2690	Buda OU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Maxwell.....	1497	Wau EAU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Minotaur H.....	2725	Wau EAU	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Moline 10.....	2250	Cont C2	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Moreland 20B.....	3125	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Napoleon 11.....	1860	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op	Shel	U	3	Spic	Math	W	W	Shel	7.8	24.97	Jac	34x3 1/2	Wan	2050	138 94
*Nelson-LeMoon F1 1/2.....	2025	Cont N	3 1/2 x 5	22.5	17	L	Idl	McC	PT	FS	Shel	G	Mon	DD	DD	Eis	Op															

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Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET		REAR AXLE		Steering Gear (Make)	TIRES, WHEELS, RIMS		Chassis Weight	P. Cent. of Weight on Rear Wheels		
		Bore and Stroke	N. A. C. C.	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter		Make	Type			Total Gear Reduction in High	Total Gear Reduction in Low
2 Ton—Con'd																						
Pierce Arrow X5	3750	4 1/2 x 5 1/2	25.6	L	C	Har	H	PT	Strm	F	Own	Full	DD	Del	W	Shel	Flot	8.33	43.3	Ros	6400 150 85	
Rainier R18	2950	4 1/2 x 5 1/2	27.2	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	8.75	39	Ros	2850 150 80	
Reliance 20B	3200	4 1/2 x 5 1/2	28.9	L	L	Bus	H	PT	Strm	F	Pier	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Royal 20W	3300	4 1/2 x 5 1/2	25.6	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Royal 20W	2575	4 1/2 x 5 1/2	25.6	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	10	30	Ros	3500 160 80	
Schuch 20	2800	4 1/2 x 5 1/2	28.9	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Sterling 20	2900	4 1/2 x 5 1/2	25.6	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Stewart 20	2900	4 1/2 x 5 1/2	25.6	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Stoughton D	3350	4 1/2 x 5 1/2	28.9	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Sullivan E	3375	4 1/2 x 5 1/2	28.9	L	L	Bus	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Sullivan E	2750	4 1/2 x 5 1/2	25.6	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Superior E	1595	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triangle 4000C	2700	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph HB-2	2850	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-1	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-2	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-3	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-4	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-5	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-6	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-7	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-8	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-9	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-10	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-11	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-12	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-13	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-14	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-15	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-16	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-17	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-18	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-19	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-20	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-21	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-22	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-23	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-24	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-25	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-26	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-27	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-28	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-29	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-30	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-31	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-32	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-33	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-34	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-35	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-36	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-37	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-38	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-39	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-40	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-41	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	
Triumph H-42	3250	3 1/2 x 5 1/2	22.5	L	L	Mod	H	PT	Strm	F	Mon	Full	DD	Eis	W	Shel	Flot	7.7	31	Ros	3500 160 80	

3½ Ton

Trade Name and Model	Chassis Price	Make and Model	Bore and Stroke	N. A. C. C.	Horsepower	ENGINE DETAILS										GEARSET										REAR AXLE		TIRES, WHEELS, RIMS		Chassis Weight	Wheelbase	P. Cent of Weight on Rear Wheels					
						Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)	Springs (Make)	Final Drive	Make	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear	Front				Rear	Wheels (Make)	Rim Equipment		
																													4 Cylinder unless otherwise noted							Front	Pneumatic
3 1/2 Ton—Con'd																																					
Aetna 135	4375	Wia BAW	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
All-Power C	5800	Buda YTU	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Armstrong KW	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Atco C	4375	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Atterbury 7D-LWB	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Atterbury 7D-Standard	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Autocar B	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Autocar Y	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Available H3 1/2	4475	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Brockway R2	4100	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Capitol M-3 1/2	3800	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Chicago C3 1/2	4400	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Clydesdale 90C	4600	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Corbitt A	6100	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Couple Gear HC	3750	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Dart W	3925	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Day Elder F	5100	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Diamond 7, K	4400	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Doane 3 1/2	4250	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Duplex K	5000	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Duplex E	3950	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Federal WE	4050	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Garford 77D	4450	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Gary KT	4375	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Giant 17	3250	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
G. M. C. 71A	3300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
G. M. C. 71B	3300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Gramm-Bernstein 35	3975	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Hahn F	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Hall 3 1/2	3975	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Harvey WHA	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Hendrickson J	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Hewitt-Ludlow	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Humbert	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5	36x5	36x5	36x5	36x5	6800	172.75	6800
Indiana 36	4300	Cont E4	4 1/2 x 6	32.4	28.9	L	D	GO	GO	F	Zen	G	Pier	B.B.	P	Bos	NE	Cott	A	4	4	Spic	Shel	W	Shel	1/2 Fl	8.75	42.33	Ros	36x5							

[illegible]

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET			REAR AXLE			TIRES, WHEELS, RIMS			Chassis Weight	Wheelbase	P.C. Cent of Weight on Rear Wheels																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
		Make and Model	Bore and Stroke	N. A. C. C.	Valve Arrangement	How Cooled	Radiator (Make)	Radiator (Type)	Lubrication	Carburetor	Fuel Feed	Governor (Make)	Clutch (Make)	Clutch (Type)	Ignition System	Engine Starter	Make	Location	Speeds	Universal (Make)				Springs (Make)	Final Drive	Type	Total Gear Reduction in High	Total Gear Reduction in Low	Steering Gear (Make)	Front		Rear		Wheels (Make)	Rim Equipment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Packard EF.....	5950	Own	5 x 5 1/2	40	L	C	Own	PT	Fin	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own

Manufacturers Whose Models Are Included in Specifications on Preceding Pages

- Acason—Acason Motor Truck Co., Detroit, Mich.
 Ace—American Motor Truck Co., Newark, Ohio.
 Acme—Acme Motor Truck Co., Cadillac, Mich.
 Aetna—Aetna Motors Corp. of N. Y., New York, N. Y.
 Akron Multi-Truck—Thomart Motor Truck Co., Kent, Ohio.
 All-American—All-American Truck Co., Chicago, Ill.
 All-Power—All-Power Truck Co., Detroit, Mich.
 American—American Motor Truck & Tractor Co., New York, N. Y.
 Apex—Hamilton Motor Co., Grand Haven, Mich.
 Armleder—O. Armleder Co., Cincinnati, Ohio.
 Atco—American Truck & Trailer Corp., Kankakee, Ill.
 Atlas—Atlas Truck Corp., York, Pa.
 Atterbury—Atterbury Motor Car Co., Buffalo, N. Y.
 Autocar—Autocar Co., Ardmore, Pa.
 Available—Available Truck Co., Chicago, Ill.
 Avery—Avery Company, Peoria, Ill.
 Beck-Hawkeye—Beck-Hawkeye Motor Truck Works, Cedar Rapids, Iowa.
 Bell—Iowa Motor Truck Co., Ottumwa, Ia.
 Belmont—Belmont Motors Corp., Lewistown, Pa.
 Bessemer—Bessemer Motor Truck Co., Grove City, Pa.
 Bethlehem—Bethlehem Motor Truck Corp., Allentown, Pa.
 Betz—Betz Motor Truck Co., Hammond, Ind.
 Birch—Birch Motor Cars, Chicago, Ill.
 Bridgeport—Bridgeport Motor Truck Co., Bridgeport, Conn.
 Brinton—Brinton Motor Truck Co., Philadelphia, Pa.
 Brockway—Brockway Motor Truck Co., Cortland, N. Y.
 Capitol—Capitol Motors Corp., Fall River, Mass.
 Chevrolet—Chevrolet Motor Co. of Mich., Flint, Mich.
 Chicago—Chicago Motor Truck, Inc., Chicago, Ill.
 Climber—Climber Motor Corp., Little Rock, Ark.
 Clydesdale—Clydesdale Motor Truck Co., Clyde, Ohio.
 Collier—Collier Motor Truck Co., Bellevue, Ohio.
 Columbia—Columbia Motor Truck & Trailer Co., Pontiac, Mich.
 Comet—Comet Automobile Co., 156 S. Water St., Decatur, Ill.
 Commerce—Commerce Motor Car Co., Detroit, Mich.
 Concord—Abbot-Downing Truck & Body Co., Concord, N. H.
 Conestoga—Conestoga Motor Truck Co., Lancaster, Pa.
 Cook—Cook Motors Corp., Kankakee, Ill.
 Corbitt—Corbitt Motor Truck Co., Henderson, N. C.
 Couple Gear—Couple Gear Freight Wheel Co., Grand Rapids, Mich.
 Dart—Dart Truck & Tractor Corp., Waterloo, Ia.
 Day-Elder—Day-Elder Motors Corp., Newark, N. J.
 Dearborn—Dearborn Truck Co., Chicago, Ill.
 Defiance—Defiance Motor Truck Co., Defiance, Ohio.
 DeKalb—DeKalb Wagon Co., DeKalb, Ill.
 Denby—Denby Motor Truck Co., Detroit, Mich.
 Dependable—Dependable Truck & Tractor Co., Galesburg, Ill.
 Diamond T—Diamond T Motor Car Co., Chicago, Ill.
 Diehl—Diehl Motor Truck Works, Philadelphia, Pa.
 Doane—Doane Motor Truck Co., San Francisco, Cal.
 Dodge—Dodge Bros., Detroit, Mich.
 Dorris—Dorris Motor Car Co., St. Louis, Mo.
 Double Drive—Double Drive Truck Co., Chicago, Ill.
 Douglas—Douglas Motors Corp., Omaha, Nebr.
 Duplex—Duplex Truck Co., Lansing, Mich.
 Duty—Duty Motor Co., Greenville, Ill.
 Eagle—Eagle Motor Truck Corp., St. Louis, Mo.
 Ellsworth—Mills-Ellsworth Co., Keokuk, Ia.
 Erie—Erie Motor Truck Mfg. Co., Erie, Pa.
 F. W. D.—Four Wheel Drive Auto Co., Clintonville, Wis.
 Fageol—Fageol Motors Co., Oakland, Cal.
 Famous—Famous Trucks, Inc., St. Joseph, Mich.
 Fargo—Fargo Motor Truck Co., Chicago, Ill.
 Federal—Federal Motor Truck Co., Detroit, Mich.
 Ford—Ford Motor Co., Highland Park, Mich.
 Forschler—Forschler Motor Truck Mfg. Co., New Orleans, La.
 Front Drive—Double Drive Truck Co., Chicago, Ill.
 Fulton—Fulton Motors Corp., New York, N. Y.
 G. M. C.—General Motors Truck Co., Pontiac, Mich.
 G. W. W.—Wilson Truck Mfg. Co., Henderson, Ia.
 Garford—Garford Motor Truck Co., Lima, Ohio.
 Gary—Gary Motor Truck Co., Gary, Ind.
 Gersix—Gersix Mfg. Co., Seattle, Wash.
 Giant—Giant Truck Corp., Chicago Heights, Ill.
 Graham—Graham Brothers, Evansville, Ind.
 Gramm-Bernstein—Gramm-Bernstein Motor Truck Co., Lima, Ohio.
 Grant—Grant Motor Car Corp., Truck Division, Cleveland, Ohio.
 Hahn—Hahn Motor Truck & Wagon Co., Hamburg, Pa.
 Hal-Fur—Hal-Fur Motor Truck Co., Cleveland, Ohio.
 Hall—Lewis-Hall Motors Corp., Detroit, Mich.
 Harvey—Harvey Motor Truck Co., Harvey, Ill.
 Hawkeye—Hawkeye Truck Co., Sioux City, Ia.
 Hendrickson—Hendrickson Motor Truck Co., Chicago, Ill.
 Hewitt-Ludlow—Ralston Iron Works, San Francisco, Cal.
 Highway—Knight-Highway Motors Co., Chicago, Ill.
 Higrade—Higrade Motors Co., Harbor Springs, Mich.
 H & M—H & M Motor Truck Co., Inc., Baltimore, Md.
 Hoover—Hoover Wagon Co., York, Pa.
 H. R. L.—H. R. L. Motor Co., Seattle, Wash.
 Huffman—Huffman Bros. Co., Elkhart, Ind.
 Hurlburt—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.
 Independent—Independent Motor Co., Youngstown, O.
 Independent—Independent Motor Truck Co., Inc., Davenport, Ia.
 Indiana—Indiana Truck Corp., Marion, Ind.
 International—International Harvester Co., Chicago, Ill.
 Jackson—Jackson Motors Corp., Jackson, Mich.
 J and J—The Lorain Motor Truck Co., Lorain, O.
 Jumbo—Nelson Motor Truck Co., Saginaw, Mich.
 Kalamazoo—Kalamazoo Motor Corp., Kalamazoo, Mich.
 Kankakee—Kankakee Automobile Co., Kankakee, Ill.
 Karavan—Karavan Motors Co., Portland, Ore.
 Kearns—Kearns-Duglie Motors Co., Danville, Pa.
 Kelly-Springfield—Kelly-Springfield Motor Truck Co., Springfield, Ohio.
 Keystone—Keystone Motor Truck Corp., Philadelphia, Pa.
 Kimball—Kimball Motor Truck Co., Los Angeles, Cal.
 King Zeitler—King Zeitler Co., Chicago, Ill.
 Kissel—Kissel Motor Car Co., Hartford, Wis.
 Kleiber—Kleiber & Co., Inc., San Francisco, Cal.
 Knox—Knox Motors Co., Springfield, Mass.
 Koehler—H. J. Koehler Motors Corp., Bloomfield, N. J.
 Kuhn—Kuhn Tractor Truck Co., Seattle, Wash.
 Lange—Lange Motor Truck Co., Pittsburgh, Pa.
 Larrabee-Deyo—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.
 L. M. C.—Louisiana Motor Car Co., Shreveport, La.
 Lombard—Lombard Auto Tractor Truck Corp., New York, N. Y.
 Lone Star—Lone Star Truck & Tractor Assn., San Antonio, Texas.
 Luedinghaus—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
 Luverne—Luverne Automobile Co., Luverne, Minn.
 Maccar—Maccar Truck Co., Scranton, Pa.
 MacDonald—MacDonald Truck & Tractor Co., San Francisco, Cal.
 Mack—International Motor Co., New York, N. Y.
 Marshall—Marshall Mfg. Co., Chicago, Ill.
 Master—Master Trucks, Inc., Chicago, Ill.
 Maxwell—Maxwell Motor Co., Inc., Detroit, Mich.
 Menominee—Menominee Motor Truck Co., Menominee, Mich.
 Moline—Moline Plow Co., Moline, Ill.
 Moreland—Moreland Motor Truck Co., Los Angeles, Cal.
 Mutual—Mutual Truck Co., Sullivan, Ind.
 Napoleon—Napoleon Motors Co., Traverse City, Mich.
 Nash—Nash Motors Co., Kenosha, Wis.
 Nelson-LeMoon—Nelson & LeMoon, Chicago, Ill.
 Netco—New England Truck Co., Fitchburg, Mass.
 Niles—Niles Motor Truck Co., Pittsburgh, Pa.
 Noble—Noble Motor Truck Co., Kendallville, Ind.
 Northway—Northway Motors Co., Natick, Mass.
 Northwestern—Starr Carriage Co., Seattle, Wash.
 Norwalk—Norwalk Motor Car Co., Martinsburg, W. Va.
 O. K.—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
 Ogden—Ogden Motor & Supply Co., Chicago, Ill.
 Old Hickory—Kentucky Wagon Mfg. Co., Louisville, Ky.
 Old Reliable—Old Reliable Motor Truck Co., Chicago, Ill.
 Oldsmobile—Olds Motor Works, Lansing, Mich.
 Oneida—Oneida Motor Truck Co., Green Bay, Wis.
 Orleans—New Orleans Motor Truck Mfg. Co., New Orleans, La.
 Oshkosh—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
 Packard—Packard Motor Car Co., Detroit, Mich.
 Paige—Paige-Detroit Motor Car Co., Detroit, Mich.
 Parker—Parker Motor Truck Co., Milwaukee, Wis.
 Patriot—Patriot Motors Co., Lincoln, Neb.
 Pierce-Arrow—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
 Pioneer—Pioneer Truck Co., Chicago, Ill.
 Pittsburgher—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
 Power—Power Truck & Tractor Co., Detroit, Mich.
 Rainier—Rainier Motor Corp., Flushing, L. I., N. Y.
 Reliance—Reliance Motor Truck Co., Appleton, Wis.
 Reo—Reo Motor Car Co., Lansing, Mich.
 Republic—Republic Motor Truck Co., Inc., Alma, Mich.
 Reynolds—Reynolds Motor Truck Co., Mt. Clemens, Mich.
 Riker—Locomobile Co. of America, Bridgeport, Conn.
 Rowe—Rowe Motor Mfg. Co., Lancaster, Pa.
 Royal—Royal Motor Truck of N. Y., New York, N. Y.
 Sandow—Sandow Motor Truck Co., Chicago, Ill.
 Sanford—Sanford Motor Truck Co., Syracuse, N. Y.
 Schacht—G. A. Schacht Motor Truck Co., Cincinnati, O.
 Schwartz—Schwartz Motor Truck Co., Reading, Pa.
 Seiden—Seiden Truck Corp., Rochester, N. Y.
 Seneca—Seneca Motor Car Co., Postoria, O.
 Service—Service Motor Truck Co., Wabash, Ind.
 Shaw—Walden W. Shaw Livery Co., Chicago, Ill.
 Signal—Signal Motor Truck Co., Detroit, Mich.
 Southern—Southern Truck & Car Corp., Greenboro, N. C.
 Standard—Standard Motor Truck Co., Detroit, Mich.
 Sterling—Sterling Motor Truck Co., Milwaukee, Wis.
 Stewart—Stewart Motor Corp., Buffalo, N. Y.
 Stoughton—Stoughton Wagon Co., Stoughton, Wis.
 Success—Webberville Truck Co., Webberville, Mich.
 Super Truck—OConnell Motor Truck Co., Waukegan, Ill.
 Sullivan—Sullivan Motor Truck Co., Rochester, N. Y.
 Superior—Superior Motor Truck Co., Atlanta, Ga.
 Texan—Texas Motor Car Asso., Fort Worth, Texas.
 Tiffin—Tiffin Wagon Co., Tiffin, Ohio.
 Titan—Titan Truck Co., Milwaukee, Wis.
 Tower—Tower Motor Truck Co., Greenville, Mich.
 Traffic—Traffic Motor Truck Corp., St. Louis, Mo.
 Transport—Transport Truck Co., Mt. Pleasant, Mich.
 Traylor—Traylor Eng. & Mfg. Co., Cornwells, Pa.
 Triangle—Triangle Motor Truck Co., St. Johns, Mich.
 Triumph—Triumph Truck & Tractor Co., Kansas City, Mo.
 Twin City F. W. D.—Twin City Four Wheel Drive Co., Inc., St. Paul, Minn.
 Twin City—Minneapolis Steel & Mach. Co., Minneapolis, Minn.
 Ultimate—Vreeland Motor Co., Inc., Newark, N. J.
 Union—Union Motor Truck Co., Bay City, Mich.
 United—United Motors Co., Grand Rapids, Mich.
 U. S.—United States Motor Truck Co., Cincinnati, Ohio.
 Velle—Velle Motors Corp., Moline, Ill.
 Vim—Vim Motor Truck Co., Philadelphia, Pa.
 Walker—Johnson—Walker-Johnson Truck Co., Woburn, Mass.
 Walter—Walter Motor Truck Co., New York, N. Y.
 Ward La France—Ward La France Truck Co., Inc., Elmira, N. Y.
 Watson—Watson Wagon Co., Canastota, N. Y.
 Wells—Evans Truck & Axle Co., Auburn, Ind.
 White—White Co., Cleveland, Ohio.
 White Hickory—White Hickory Motor Corp., Atlanta, Ga.
 Wichita—Wichita Falls Motor Co., Wichita Falls, Tex.
 Wilcox—H. E. Wilcox Motor Co., Minneapolis, Minn.
 Wilson—J. C. Wilson Co., Detroit, Mich.
 Winther—Winther Motor Truck Co., Kenosha, Wis.
 Witt-Will—Witt-Will Co., Inc., Washington, D. C.
 Wolverine—American Commercial Car Co., Detroit, Mich.

Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

	36 x 6					38 x 7					40 x 8					42 x 9					44 x 10				
	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure	Price	Carrying Capacity	Inflation Pressure				
Ajax Rubber Co., Inc., New York, N. Y.																									
Ajax Cord, non-skid	30 3 1/2	32 4	34 4	35 5	36 5	37 5	38 5	39 5	40 5	41 5	42 5	43 5	44 5	45 5	46 5	47 5	48 5	49 5	50 5	51 5	52 5				
American Rubber & Tire Co., Akron, O.																									
Americord, non-skid	29 39	41 88	44 65	46 42	48 39	50 36	52 33	54 30	56 27	58 24	60 21	62 18	64 15	66 12	68 9	70 6	72 3	74 0	76 0	78 0	80 0				
Baltimore Rubber Tire Mfg. Co., Baltimore, Md.																									
Box Tread, non-skid	29 39	41 88	44 65	46 42	48 39	50 36	52 33	54 30	56 27	58 24	60 21	62 18	64 15	66 12	68 9	70 6	72 3	74 0	76 0	78 0	80 0				
Atlantic, non-skid	29 39	41 88	44 65	46 42	48 39	50 36	52 33	54 30	56 27	58 24	60 21	62 18	64 15	66 12	68 9	70 6	72 3	74 0	76 0	78 0	80 0				
Bergougnan Rubber Corp., Trenton, N. J.																									
Bergougnan Cord, non-skid	39 60	62 50	66 80	73 35	77 65	83 10	88 00	93 10	98 00	103 10	108 00	113 10	118 00	123 00	128 00	133 00	138 00	143 00	148 00	153 00	158 00				
Bricton Mfg. Co., Omaha, Neb.																									
Bricton P. P. Studded	42 85	65 15	69 45	77 85	85 40	93 10	106 50	114 00	121 00	128 00	135 00	142 00	149 00	156 00	163 00	170 00	177 00	184 00	191 00	198 00	205 00				
Braender Rubber & Tire Co., Rutherford, N. J.																									
Braender Super Cord, non-skid	33 00	52 30	55 30	59 15	62 05	65 05	73 35	76 35	79 35	82 35	85 35	88 35	91 35	94 35	97 35	100 35	103 35	106 35	109 35	112 35	115 35				
Brunswick-Balke-Collender Co., Chicago, Ill.																									
Brunswick-Cord, non-skid	32 50	52 30	55 30	59 15	62 05	65 05	73 35	76 35	79 35	82 35	85 35	88 35	91 35	94 35	97 35	100 35	103 35	106 35	109 35	112 35	115 35				
Columbia Tire & Rubber Co., Mansfield, O.																									
Columbia Fabric	26 05	41 00	43 85	46 70	49 55	52 40	55 25	58 10	60 95	63 80	66 65	69 50	72 35	75 20	78 05	80 90	83 75	86 60	89 45	92 30	95 15				
Curtis Tire & Rubber Co., Muskegon, Mich.																									
Curtis Cord, road	62 40	66 00	74 25	78 30	82 35	86 40	90 45	94 50	98 55	102 60	106 65	110 70	114 75	118 80	122 85	126 90	130 95	135 00	139 05	143 10	147 15				
Empire Tire & Rubber Co., Trenton, N. J.																									
Empire Cord, non-skid	56 55	59 60	63 70	67 05	70 40	73 75	77 10	80 45	83 80	87 15	90 50	93 85	97 20	100 55	103 90	107 25	110 60	113 95	117 30	120 65	124 00				
Erle Tire & Rubber Co., Sandusky, O.																									
Erle, non-skid	31 15	55 30	59 15	62 05	65 05	68 05	73 35	76 35	79 35	82 35	85 35	88 35	91 35	94 35	97 35	100 35	103 35	106 35	109 35	112 35	115 35				
Falls Rubber Co., Cuyahoga Falls, O.																									
Falls Cord, Neverslip Cord	58 75	61 95	66 20	69 75	73 30	76 85	80 40	83 95	87 50	91 05	94 60	98 15	101 70	105 25	108 80	112 35	115 90	119 45	123 00	126 55	130 10				
Federal Rubber Co. of Ill., Cudahy, Wis.																									
Federal Cord, non-skid	35 75	58 55	59 60	65 25	68 75	72 30	75 85	79 40	82 95	86 50	90 05	93 60	97 15	100 70	104 25	107 80	111 35	114 90	118 45	122 00	125 55				
Federal H. D. Cord, non-skid	35 75	58 55	59 60	65 25	68 75	72 30	75 85	79 40	82 95	86 50	90 05	93 60	97 15	100 70	104 25	107 80	111 35	114 90	118 45	122 00	125 55				
Firestone Tire & Rubber Co., Akron, O.																									
Firestone Cord, non-skid	34 25	52 30	55 30	59 15	62 05	65 05	73 35	76 35	79 35	82 35	85 35	88 35	91 35	94 35	97 35	100 35	103 35	106 35	109 35	112 35	115 35				
Fisk Rubber Co., Chicopee Falls, Mass.																									
Fisk Cord, non-skid	32 50	56 25	58 05	64 65	67 85	71 05	77 65	80 85	84 05	87 25	90 45	93 65	96 85	100 05	103 25	106 45	109 65	112 85	116 05	119 25	122 45				
General Tire & Rubber Co., Akron, O.																									
General Cord, non-skid	32 50	56 25	58 05	64 65	67 85	71 05	77 65	80 85	84 05	87 25	90 45	93 65	96 85	100 05	103 25	106 45	109 65	112 85	116 05	119 25	122 45				
Gillette Rubber Co., Eau Claire, Wis.																									
Gillette Safety Tread	58 75	61 95	66 20	69 75	73 30	76 85	80 40	83 95	87 50	91 05	94 60	98 15	101 70	105 25	108 80	112 35	115 90	119 45	123 00	126 55	130 10				
Goodrich, B. F. Rubber Co., Akron, O.																									
Goodrich Cord, ribbed	58 75	61 95	66 20	69 75	73 30	76 85	80 40	83 95	87 50	91 05	94 60	98 15	101 70	105 25	108 80	112 35	115 90	119 45	123 00	126 55	130 10				
Goodrich Cord, Safety	58 75	61 95	66 20	69 75	73 30	76 85	80 40	83 95	87 50	91 05	94 60	98 15	101 70	105 25	108 80	112 35	115 90	119 45	123 00	126 55	130 10				
Goodyear Tire & Rubber Co., Akron, O.																									
Goodyear Cord, ribbed	55 30	59 15	62 05	65 05	68 05	71 05	74 05	77 05	80 05	83 05	86 05	89 05	92 05	95 05	98 05	101 05	104 05	107 05	110 05	113 05	116 05				
Goodyear Cord, All Weather	55 30	59 15	62 05	65 05	68 05	71 05	74 05	77 05	80 05	83 05	86 05	89 05	92 05	95 05	98 05	101 05	104 05	107 05	110 05	113 05	116 05				
Gordon Tire & Rubber Co., Canton, O.																									
Gordon, non-skid	28 40	52 90	55 10	62 90	68 30	73 30	81 20	86 30	91 30	96 30	101 30	106 30	111 30	116 30	121 30	126 30	131 30	136 30	141 30	146 30	151 30				
Hewitt Rubber Co., Buffalo, N. Y.																									
Hewitt Cord, non-skid	35 85	58 10	61 40	65 70	68 90	72 10	75 30	78 50	81 70	84 90	88 10	91 30	94 50	97 70	100 90	104 10	107 30	110 50	113 70	116 90	120 10				
Howe Rubber Co., Inc., New Brunswick, N. J.																									
Howe Ultra Cord, non-skid	35 85	58 10	61 40	65 70	68 90	72 10	75 30	78 50	81 70	84 90	88 10	91 30	94 50	97 70	100 90	104 10	107 30	110 50	113 70	116 90	120 10				
India Tire & Rubber Co., Akron, O.																									
India Cord, non-skid	35 95	61 60	65 00	69 40	73 15	76 65	80 90	84 65	88 40	92 15	95 90	99 65	103 40	107 15	110 90	114 65	118 40	122 15	125 90	129 65	133 40				
International India Rubber Corp., S. Bend, Ind.																									
Odell Cord, non-skid	28 50	40 25	43 75	51 85	54 95	58 05	62 95	66 05	69 15	72 25	75 35	78 45	81 55	84 65	87 75	90 85	93 95	97 05	100 15	103 25	106 35				
Kelly-Springfield Tire Co., New York, N. Y.																									
Kelly-Springfield Cord, grooved	59 75	62 50	69 75	73 50	77 00	80 50	84 00	87 50	91 00	94 50	98 00	101 50	105 00	108 50	112 00	115 50	119 00	122 50	126 00	129 50	133 00				
Kelly-Springfield Cord, E. E.	59 75	62 50	69 75	73 50	77 00	80 50	84 00	87 50	91 00	94 50	98 00	101 50	105 00	108 50	112 00	115 50	119 00	122 50	126 00	129 50	133 00				
Lee Tire & Rubber Co., New York, N. Y.																									

Manhattan Tire & Rubber Co., Mansfield, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Manhattan Fabric	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Marathon Tire & Rubber Co., Cuyahoga Falls, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Marathon Cord, Angle	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Mason Tire & Rubber Co., Kent, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Mason Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Meyer Rubber Co., Columbiana, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Meyer, ribbed	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Michelin Tire Co., Miltoin, N. J.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Michelin Fabric	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Miller Rubber Co., Akron, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Miller Cord, "Geared-to-the-Road"	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Mohawk Rubber Co., Akron, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Mohawk Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Monarch Rubber Co., Hartsville, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Monarch Cord, ribbed	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Monarch Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
National Tire & Rubber Co., E. Palestine, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Roamer Fabric, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Olympian Fabric, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Roamer Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Olympian Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Nebraska Tire & Rubber Co., Omaha, Neb.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Cornhusker	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Norwalk Tire & Rubber Co., Norwalk, Conn.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Norwalk Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Oldfield Tire Co., Cleveland, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Oldfield Cord, anti-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Para Bell Tire & Rubber Co., Mansfield, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Para Bell, Fabric	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Para Bell, Cord	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Pennsylvania Rubber Co., Jeannette, Pa.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Vacuum Cup, Cord	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Perfection Tire & Rubber Co., Fort Madison, Ia.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Perfection, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Pharis Tire & Rubber Co., Newark, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Pharis, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Quaker City Rubber Co., Philadelphia, Pa.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Quaker, plain	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
T. T. T., non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Racine Auto Tire Co., Racine, Wis.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Horseshoe Cord, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Ribbed Tread	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Racine Rubber Co., Racine, Wis.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Racine Multi-Mile, Cord	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Republic Rubber Co., Youngstown, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Republic Grande Cord, ribbed	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Republic Grande Cord, Staggard Tread	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Spreckels Savage Tire Co., San Diego, Cal.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Savage Cord	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Standard Tire Co., Willoughby, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Tiger Foot, non-skid	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Stanwood Rubber Co., Inc., Elizabeth, N. J.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Stanwood, Whippet Tread Cord	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Stanwood Whippet Tread Fabric	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Star Rubber Co., Akron, O.	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200	100	151.90	3000	100	195.70	3750	110	245.20	5000	120	342.65	6000	130
Star Cord, All Star	26.05	41.00	43.85	73.30	89.40	92.80	120.00	2200													

Repairing the Giant Pneumatic Cord Truck Tire*

In This Article Methods of Repairing Tread Cuts or Blowouts With Separation Which Results in a Fabric Break Are Explained

WHEN a bad break occurs in the fabric it is usually necessary to build a new section into the tire. This method of repair is always used where there is a large cut through the tire or a fabric break through all of the layers or almost all the plies.

Before making a sectional repair, the entire casing should be thoroughly examined to ascertain whether there is a general separation around the tire, as another break would soon occur at some other point.

If a general separation is found at the cushion or breaker strip, the entire tread

removed. Then lay back the tread and chafing strips. Replace the sidewall rubber and cure the repair in a sectional mold on a steam-heated sectional bag or in a sectional mold, then on an inside patch vulcanizer, remembering that heat must be applied to both sides.

When the injury is on the side so that plies have to be removed around the bead, lay back the chafing strips and repair as usual. Replace the chafing strips when building up the repair.

How to Tear Down the Casing

First, the number of plies that will have to be removed must be determined. In 6-in. and 7-in. tires, which are made from ten plies of cord fabric, four plies should be removed from the outside and three from the inside of the tire.

Eight-inch tires are made from twelve plies of cord fabric. Six plies should be removed from the outside and three from the inside.

Nine-inch tires are made from fourteen plies of fabric. Six plies should be removed from the outside of the tire and four from the inside.

Ten-inch tires are made from sixteen plies. Remove eight from the outside and four from the inside.

Each of these plies should be stepped down 1 in. from where the preceding ply was cut out, whenever possible. This can always be done in the length of the tire, but is not always possible in width of tire. Make steps as large as practical.

Where there is no separation in the tire at the cushion or breaker and, therefore, no retread is required, skin back the tread, under tread, breaker and cushion down to the very last ply, from a point $7\frac{1}{2}$ in. from one edge of the injury to a point $7\frac{1}{2}$ in. from the opposite edge on 6-in. or 7-in. tires, and $9\frac{1}{2}$ in. on an 8-in. or 9-in. tire. Bevel the edge of the tread where it is cut across the tire.

Now remove the sidewall rubber around the tire as far as the tread is laid back. Cut the chafing strips loose down to the bottom or heel of the bead.

Measure back $1\frac{1}{2}$ in. from the cut across the tread and the heel of the bead, and with a sharp fabric knife cut through the top ply only of the casing. Then, by means of an awl and a pair of pliers, remove the portion of the top ply or layer of cords which has been marked off. Each of the cords must be removed, but they can soon be gotten hold of at the cut end by means of the awl and pliers and ripped loose. In a similar way, remove each of the other plies necessary, stepping each one down 1 in.

When there is not enough space between the edges of the injury and the heel



Fig. 2. Showing the Tread Laid Back and the Loose Cords and Rubber Cut Away

can be cut off down to the last ply, a sectional repair is then made, and the tire retreaded.

The length of the repair should be as short as possible so that it can be cured in a sectional mold at one time. Two cures should be avoided, if possible. It must be remembered that a sectional repair must be cured by applying heat to both the outside and the inside in order to be successful.

Making a Sectional Repair

The general procedure is the same as that used to build sections into a fabric tire, namely, lay back the tread, remove the sidewall rubber and lay back the chafing strips to the heel of the bead an equal distance on both sides of the injury. Then remove part of the injured plies from the outside of the tire and part from the inside. The largest ply should be removed first and each succeeding ply stepped down so that each one is 3 in. shorter and narrower than the last one removed. Apply new cord fabric to take the place of that

* (The method outlined in this and succeeding articles are those recommended by the Experimental Department of the Goodyear Tire & Rubber Co., of Akron, O. This company is continuing its experiments in this work and will welcome any criticisms or suggestions for improvements.)



Fig. 1. Tire With Blow-Out and a Cut Extending Through All of the Plies. This Repair Requires Building-in a Section.



Fig. 3. This Shows the Plies Stepped-Out in One and a Half Inch Steps and the Chafing Strips Laid Back Ready for Buffing.

of the bead to make a 1-in. step-down, the distance between the edges of the plies removed should be as near 1 in. as possible. The edge of the last ply removed should never be closer than 2 in. to the edge of the hole through the casing across the tire, and not closer than 3 in. lengthwise of the tire.

To facilitate work on the inside of the tire, spread the beads with two tire spreaders far enough apart to give ample room. The inside plies are removed in the same way as from the outside, three plies on 6-in. and 7-in. tires and four plies on the inside of 8-in. and 9-in. tires. There is this difference, however, that the first ply removed should be stepped back $1\frac{1}{2}$ in. beyond the point where the tread is cut loose on the outside of the tire. The first ply removed from the inside is made 6 in. longer, therefore, than the first ply removed from the outside of the tire. Then remove as many plies as necessary, stepping each ply down as nearly 1 in. as possible. Care must be taken not to take any plies off down to the toe of or around the bead. The first step-down should be made at least 2 in. above the toe of the bead.

When the entire tread has been removed, the plies should be removed in the same manner as when the tread has

merely been lifted back. The first outside ply removed should extend 6 in. from each end of the injury on a 6-in. or 7-in. tire and 8 in. on an 8-in. or 9-in. tire, and 10 in. on a 10-in. tire. On the inside of the casing, the first ply removed should extend around the tire 3 in. beyond each end of the first ply removed from the outside.

Now Buff and Dry

All exposed fabric surface, both inside and outside, should be thoroughly buffed, removing any old friction still adhering to the fabric. The chafing strips, which have been laid back, should be buffed on both the under and top sides. If the tread has been lifted, buff the bottom side of this. When the tire is to be retreaded, the whole top side of the carcass must be buffed. It is also important on the inside of the tire to buff about 2 in. beyond the first step to remove the tire lining and soapstone.

Any raggedness around the injury or due to buffing should be trimmed off with a sharp knife.

Drying and Cementing

Before any cement is applied, the tire must be thoroughly dried, as even a small amount of moisture in the fabric will cause separation of the plies and ruin the repair. A small room or box ventilated and heated to 150 deg. dry heat should be used for this purpose. When such a drier is not available, an inside patch vulcanizer can be used.

Building-Up the Casing

Before rebuilding and after thoroughly drying, wash the entire surface to be repaired both inside and outside with gasoline. Next, apply three coats of C-15 or C-16 cement, as described in previous installments of this series of articles. The inside surface should be cemented 1 in. beyond the first step in the fabric and if the tire is to be retreaded, cement the entire outside surface. If a section of the tread has been lifted, cement the bottom side of the lifted portion and the bottom and top sides of the chafing strips.

With G-170 cushion gum now cover the



Fig. 4. Showing the Section Built-Up With Cord Fabric Ready for a Coat of G-170



Fig. 5. This Shows the Tire After a Ply of G-170 Has Been Put on and the Side-Wall Built Up With G-100, Ready to Lay the Tread Back in Place and Stitch It Down.

edges of the hole in the fabric, both inside and outside, to a thickness of $\frac{1}{32}$ of an inch. Fill the hole itself through the tire flush, with G-170 cushion gum. The direction of the cords in each ply of fabric stepped-out should be noted. Then cover the outside surface of the repair with a ply of G-170 cushion gum $\frac{1}{32}$ of an inch thick, extending $1\frac{1}{2}$ in. beyond the first and largest step in the fabric or over the entire surface of the exposed fabric, if the whole tread has not been removed for retreading.

Filling in With Cord Fabric

From CF-44 cord fabric cut pieces large enough not only to replace each of the ones which have been removed, but long enough and wide enough to lap $\frac{3}{4}$ of an inch on each side beyond the step in the ply which it releases. Tests have shown that a $\frac{3}{4}$ -in. lap is stronger than the full strength of the unspliced fabric. Such a lap, therefore, makes each ply as strong, if not stronger, than it was before the repair was made. Careful attention should be given to have the cords run in exactly the same directions as those in the ply which is being replaced and the cord fabric should be applied with the coated side down. Apply the smallest piece first, lapping the step-off $\frac{3}{4}$ of an inch all around, cords in the same direction as the ply being replaced and with coated side down.

Now roll the fabric down thoroughly, especially in the corners formed by the step-off, so that there will be no air trapped below it. Next, cover the edges of this piece of fabric just applied with strips of G-170 cushion gum $\frac{1}{4}$ in. wide and the usual $\frac{1}{32}$ of an inch thick. In a similar manner, apply two plies, or one-half of the total number required for a 6-in. or 7-in. tire, to the outside, or, in the case of an 8-in. or 9-in. tire, apply three plies, 10-in., four plies. The next plies, it will be noted have their cords running in the opposite direction and the remain-

ing pieces of fabric should, of course, be applied so that the direction of their cords is similar.

In order that there may be no excessive friction where the cords cross in opposite diagonal directions, a ply of G-170 cushion gum $\frac{1}{32}$ of an inch thick and long enough and wide enough to extend to the step in the top ply should now be put on and thoroughly rolled down. Now, the remaining pieces of cord fabric can be applied coated side down and cords running in the same direction as the plies which have been replaced. Cover the edges of each piece of fabric applied in this way with strips of G-170 cushion gum $\frac{1}{4}$ in. wide and $\frac{1}{32}$ of an inch thick, except the last ply.

If retreading is necessary, the outside of the tire can now be dropped until the inside part of the repair has been completed, then the retreading can be done, instructions for which will be given in a succeeding issue.

Where the tread has only been lifted back, the next step is to cover, with a ply of G-170 cushion gum $\frac{1}{32}$ of an inch thick, the entire outside surface of the repair, extending across the entire surface from which the tread has been lifted and down to the heel of the beads from where the sidewall rubber and chafing strips have been skinned back. The cushion gum should extend a little beyond the cut across the tread, so that it will actually run through the plies in the tread.

Replacing the Tread

Any small cuts in the tread should be filled with G-100 or G-105 tread repair gum. Also, fill in cavities which have been chafed or cut into the bottom side of the tread due to separation, using G-170 cushion gum. Now, replace the sidewall rubber with G-105 tread repair gum, thoroughly rolling it down. Next, cover the edges of the lifted tread with a strip of G-170 cushion gum $\frac{1}{32}$ of an inch thick and lay the tread back into place, rolling it very thoroughly as it falls into its original position, so that no air will be trapped. If the ends of the tread do not quite come



Fig. 6. This Shows the Tire After the Sectional Repair Has Been Completed and the Tread Laid Back in Place.

together, the gap may be filled with G-100 tread gum, if white, and G-105, if the tread is black.

Look Out for Trapped Air

If all the depressions on the under side of the tread have not been properly filled and if the tread itself has not been properly rolled into position, there will be cavities or depressions on the under side which may have air in them. These will usually cause a separation of the tread during the cure. It is, therefore, most important that all such depressions and irregularities in the surface be filled up and leveled off with G-170 cushion gum.

After trimming off the rough edges around the repair, the inside of the repair may now be completed.

Completing the Inside

The inside of the repair should now be covered with a ply of G-170 cushion gum 1/32 of an inch thick extending 1½ in. beyond the step in the inside ply of the tire. Roll this gum down thoroughly.

With pieces of CF-44 cord fabric, replace the fabric which has been removed just in the same manner as was done on the outside of the tire, namely, coated side of fabric down, direction of cords same as ply being replaced, the edge of each ply covered with a ¾ in. wide and 1/32 in. thick strip of G-170 cushion gum. As all of the plies which are now to be

replaced on the inside have their cords running in the same direction, there will be no need of using a thin ply of G-170 cushion gum between them, as was done on the outside.

Reinforcing Patch

Following the last ply of fabric on the inside of the tire, there should be built up on the inside of the repair a small patch directly over the injury through the plies. This is to serve as a reinforcement. In a 6-in. or 7-in. tire, the patch should consist of three plies, in an 8-in. or 9-in. tire of four plies. The smallest ply of the patch should be 4 in. longer and wider than the break or cut through fabric. The other plies should be stepped up 1 in. in length and width. Apply the smallest ply of the patch first, coated side down with the cords running in a direction at right angles to those of the inside ply of the tire. The cords in each of the succeeding plies should be reversed, the largest ply is last to be put on. Now put on a ply of G-170 cushion gum 1/32 in. thick, and 1 in. wider and longer than the largest ply of the patch, with its center directly over the break. Dust the inside of the tire with soapstone so that the air bag will not adhere and the tire is ready to be retreaded or cured.

Curing and retreading will be taken up in the next installment of this series of articles.

out annually for compensation, medical attention, lost time, and damage for personal injuries resulting from automobile accidents.

The Council, with the aid of automobile manufacturers, automobile driving instructors, automobile traffic managers, repair men, and the representatives of practically every industry interested in any phase of the automobile accident problem, conducted a nine-months' study of the causes of accidents and means of eradicating those causes. This study has just been completed and the findings published by the Council in the form of a set of twelve Safety Bulletins and Lessons for Automobile Drivers.

The lessons, covering every phase of motor vehicle operation and maintenance which enters into the accident problem, will be distributed by the National Council through its local councils, through automobile schools, automobile clubs, automobile insurance companies, and through every other means which presents itself.

The lessons are printed on sheets 8½ by 11 inches. On the reverse side of each is a safety bulletin illustrating some specific automobile hazard. Nine of the lessons are devoted to motor vehicle maintenance, the rest to safe operation.

Under the auspices of the Cleveland Safety Council, which has the backing of the Cleveland Chamber of Commerce, Passenger Car and Truck Dealers' Association, police department and other civic organizations, the driver school movement is to be launched in Cleveland. A series of lectures will be given, beginning January, in the Chamber of Commerce, Cleveland. Large fleet owners and manufacturers have expressed themselves as being willing to co-operate in every possible way by sending their drivers to these lectures. The activity is carried out with no cost to those attending the school.

Having purchased the land, buildings and equipment of the Victor Motor Truck & Trailer Co., the Waltham Motors Corp., 30 N. LaSalle St., Chicago, Ill., will take up truck manufacturing.

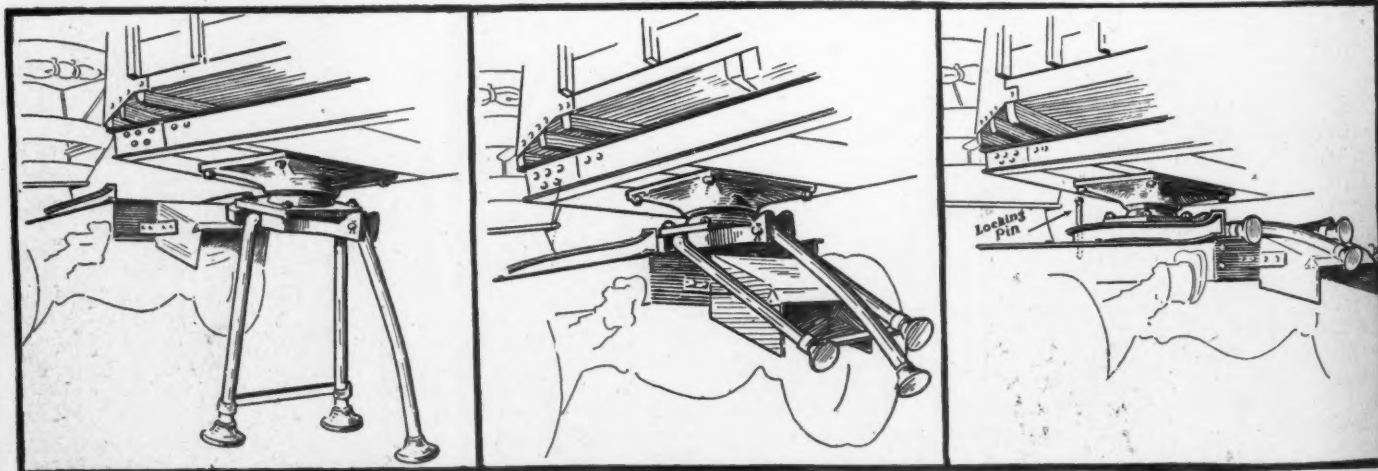
To Instruct Driver for Greater Safety

The latest campaign of the National Safety Council, to teach the fundamentals of safe driving and motor vehicle maintenance to every motor truck and passenger car driver employed in the industry, whether or not his employer is a member of the Council, is its largest undertaking yet attempted and will directly or indirectly affect every one connected with the automotive industry.

It will touch the automobile dealer by a stimulation of sales. The danger barrier which looms up before the minds of

many prospects will be partially removed by the campaign.

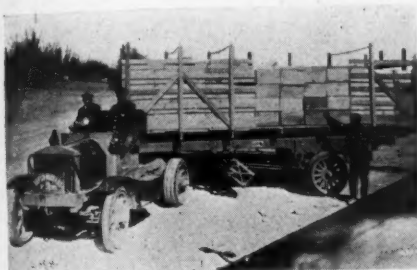
The purpose of the undertaking is three-fold: First, to reduce so far as possible the number of fatalities resulting from automobile accidents which now approximate 15,000 a year—one person is killed by an automobile every thirty-five minutes; second, to save for industry and the public at large the millions of dollars lost each year through property damage resulting from automobile accidents, this loss amounting to \$500,000 a year in a city of little more than half a million population; third, to save for industry some of the many millions of dollars now paid



These Illustrations Explain the Method in Which the No-Jack Semi-Trailer Coupling and Automatic Support is Used. It is manufactured by the J. Bryant Olds Co., Inc., Maspeth, N. Y., in three sizes, namely: Ford unit, five-ton unit and fifteen-ton unit. This device couples up at any angle. The feature of the No-jack is that this support is always available, thereby saving much time when coupling or uncoupling. When the semi-trailer is attached to the truck the support is pushed up and under the trailer body, and when the truck is being uncoupled the No-jack automatically slips back into its supporting position maintaining the trailer in its normal horizontal position. This device entirely dispenses with fifth wheels. It is a ball-and-socket joint which oscillates in every direction, relieving the tractor from shock and the semi-trailer from twisting. The tractor plate is so designed that lifting the load is easy.

The Trailer Industry on the Pacific Coast

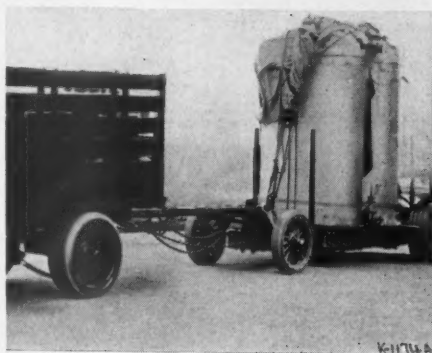
THE Pacific Coast states are not only far ahead of the Atlantic Coast states in the use of trailers, but are very active in the manufacture of all types of trailers. Conditions are ideal there for trailer use, as there is a great deal of long-distance heavy hauling, rail transportation is very inadequate, highways are good and winters are mild, with little snow and ice to interfere with motor traffic. Also there is a great deal of motor touring and camping to and from the great national parks, which creates a lively demand for camping trailers, which, as yet, are little known in the East.



One of Nine Six-Ton Semi-Trailers, Which Displaced One Hundred and Twenty Horses in the Service of an Oregon Orchard.

The lumbering industry in Washington and Oregon uses logging trailers extensively in its operation and the requirements for the service are so special that several companies have gone into the manufacture of heavy-duty logging trailers for handling the huge logs for which the Pacific northwest is famous. Commenting on hauling conditions in this industry, W. H. Chapin, Portland, Ore., says:

"On the big, heavy logging job we will find a trailer with steel wheels and giant tires 40 x 14 in. and with axles, springs, bolsters, reach, etc., to match. And that trailer at times is none too heavy. Recently I saw one outfit using 9-ft. bolsters on the trucks and trailers.



Special Trailer Used by Southern California Edison Co. for Transporting Nineteen-Ton Load, Consisting of Two Electrical Transformers.

The load was quite sizeable, as very inch of space was used.

"In our woods the 5-ft. log, that is, the log 5 ft. in diam. is not uncommon. The longer it is the more the logger can realize on it, for it is very difficult to handle logs longer than 42 ft. and consequently a premium is paid for long logs. It is not unusual to see trucks hauling poles 125 ft. long. In that case the reach is uncoupled from its truck hitch, the trailer is moved back to the desired distance and after the load is on the reach is chained to the poles."

With an intimate knowledge of these



Hauling Sacked Egyptian Corn With Three and a Half Ton Truck and a Two-Ton Trailer Between Cold River and Bakersfield, California, a Distance of Twelve Miles

conditions the Pacific Car & Foundry Co., Seattle; Wentworth & Irwin, Portland, and the Reliance Trailer & Truck Co. and the Ralston Iron Works, San Francisco, have developed and are doing a good business in special logging trail-

ers designed to meet the unusual requirements. Some of the models are built to carry loads of 10 tons on the trailer axle or total loads of 15 to 20 tons.

Trailers are found essential in the apple industry of Oregon and Washington and in the orange trade in California. The apple industry of the northwest is highly specialized and last year shipped 20,000,000 cases of apples to the East. To get highest prices for the product it is necessary to ship each night all of the day's pick in the orchards. The Dufur Orchard Co., The Dalles, Oregon, finding that even with 120 horses and several motor trucks it could not keep



Extra Load Carried on This One-Ton, Two-Wheel Trailer Saves Overloading of Truck

pace with its 300 pickers, put 3 heavy duty road tractors and nine 6-ton semi-trailers in operation. Each tractor makes 8 to 10 trips to the orchard every day. These days contain 12 working hours. One trailer is in the orchard being loaded and another is at the packing house unloading while the tractor is on the road with a third trailer. By this relay system more than 1000 boxes of apples are kept moving continuously.

In San Francisco the freight platforms are only about 20 in. from the ground and drays are built with platforms to correspond. To meet the demand for this type of vehicle in motor drawn equipment the Reliance Trailer & Truck Co.,



Eight-Ton Logging Trailer Hauling Immense Fir Log and Two Smaller Logs, Owned and Operated by Tyee Traction Co., Tyee, British Columbia



General View in Washington Woods, Showing Yellow Fir Logs Being Loaded on Truck and Trailer by Engine and Derrick. Note the Plank Road.

of that city, catalogs a drop-frame 4-wheel trailer with platform 20 to 22 in. above the road surface. The Moreland Motor Truck Co., of the same city, also makes trailers to meet special local requirements.

There is great agricultural, industrial and commercial activity in southern California and a very active demand for trailers of various types and small as well as large capacities. They are used for almost every conceivable purpose, from hauling live cows to moving naval guns and immense marine engine castings to the coast ship yards. Single loads up to from 25 to 50 tons are sometimes hauled on special 4-wheel trailers equipped with 14-in. rubber tires.

The Los Angeles Trailer Co. has developed a very active business in a comprehensive line of trailers that are sold

throughout the Pacific coast states and also in the states lying between the Sierra Nevada and Rocky Mountain ranges. It also exports to various foreign countries. Its trailers are used in trains in the mining regions and by the Pacific Telephone & Telegraph Co., which is operating several work trains that provide sleeping and eating accommodations for line construction crews of 35 to 40 men. They are also in use by orange and other fruit growers, and lumber dealers use many light, self-unloading trailers designed to tip so the load will roll off by gravity.

Some years ago the Marx Trailer Co. began the manufacture of light 2-wheel camping trailers in San Diego, and the business grew to such an extent that last year it was removed to Los Angeles. The capacity of the plant was taxed to

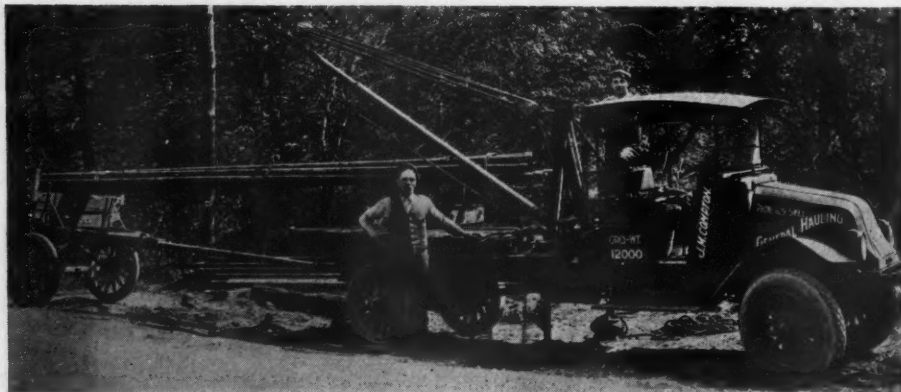
the limit during the 1920 season, camp trailers being sold all over the Far West.

The Pacific coast can boast of greater trailer activity than any other section of the country in proportion to population. Besides the seven trailer companies mentioned, the Diamond Carriage Co., Spokane, Wash., and the Auto Trailer Co., Los Angeles, have embarked in the business of making light trailers. California, with half a dozen manufacturers, has as many trailer plants as any other state with the exception of Michigan and they are very wide awake. They have competition, however, with eastern manufacturers who have been cultivating the territory assiduously. Upward of one-quarter of the past year's sales of one of the leading makers located in one of the Great Lakes states went to the Pacific coast.



Section of the Machine Shop of the New Factory Built by the Trailmobile Co.

The new factory of this company in Cincinnati, Ohio, recently completed, equipped, and occupied, is devoted exclusively to the manufacture of trailers for use in connection with motor trucks and passenger cars and contains an area of about 130,000 sq. ft. The progressive method of production is pursued, all material being routed through the plant from the receiving platform and stock room in a direct line to the shipping platform. The equipment includes pneumatic riveters, power shears, and planers, radial drills, drill presses, milling machines, shapers, lathes, etc., of the most modern manufacture. There is a complete woodworking equipment, air brush painting installations, etc.



Ingeniously Equipped Truck for Oil and Gas Well-Drilling Service

This equipment, mounted on an International truck, comprises a stake body, a power capstan, two ratchet winches, an "A" frame and a 30-ft. swivel boom crane. It was equipped according to the owner's, Mr. Compton's, own ideas and is used for hauling oil and gas well-drilling tools, machinery and general heavy hauling. The main capstan is operated by the power taken from the transmission through a special countershaft and is controlled from the driver's seat, while the two ratchet winches on each side serve the purpose of operating more than one line at a time and enables the driver to pull the truck in and out of places that would be impossible to get to with any standard equipped truck. The boom crane is of the telescope type. It can be set to any length within its total length and can be swung into any position. Loads up to one ton in weight, can be picked up from either side of the truck, lifted and placed either on the truck or the trailer in a few minutes' time. Tool boxes are built in under the body which carry a complete riggers' outfit, such as blocks and tackles, pinch bars, jacks, etc. When lifting loads with the boom crane, heavy jacks are placed under the "A" frame in order to keep the truck frame from swaying.

Highway Transportation and Its Effect on Business

The recent activities of the Rural Motor Express Committee, in the development of rural motor express lines, have been largely centered around Louisville, Kentucky, where encouragement and aid has been extended in the formation of a State-wide movement of rural express lines. Those are known as the Union Transportation Lines and are operating about twelve individual branches or sections. Work in that territory is now completed and attention is being centered upon the accomplishment of this development in and around Pittsburgh.

Extension aid is being lent in the development of rural motor express terminals, return loads bureaus, etc., through the medium of Chambers of Commerce and commercial organizations in the United States and Canada.

A map of the State of New York has been prepared showing rural motor express lines which have been organized recently. This is entirely apart from what is known as farmer-owned trucks.

Many cities are seeking data for motor bus operation with the idea of installing motor buses either as feeders to urban and interurban electric railway systems, or as transportation lines operated through preferred sections.

The Southern Wholesale Grocers' Association of Jacksonville, Fla., has made a plea to the railroads for better service in l. c. l. freight shipments, stating that the service rendered in handling less carload freight is in a rut, and that the present state of affairs, so far as the wholesale grocers are concerned, has existed for the past 15 or 20 years; that while the method of handling carload shipments has advanced, l. c. l. shipments have suffered greatly. As the great bulk of their business constitutes shipments to small retail grocers, this Association believes more attention should be given to the development of this short haul l. c. l. business. A few months ago at its Convention in St. Louis, this Association by Resolution endorsed the motor truck as being paramount for handling business of this character.

Repair Shop Appliances

(Continued from page 66)

lifting strains. It slides on the column, having a long bearing and can be clamped in any position. The ways are wide. The arm is raised and lowered by power by a lever at the top of the column, which has a tendency of throwing itself into neutral when tumbler gears are engaged, making it necessary for the operator to keep his hand on the lever when raising or lowering the arm. The tumbler gears are idle except when forced into mesh by the lever.

The base is deep and well ribbed and is provided with large T-slots. The oil channel around the base drains through a screen into a large reservoir. The head is heavily constructed and exactly balanced on the way of the arm. It is moved along the arm by a rack and pinion, reduction gears and a hand-wheel. This places it in reach of the operator when the arm is in its highest position. The head is clamped by two screws operated by one handle against the gib. One of the principal features is the helical spindle gears.

The back gears are mounted in a fully-enclosed bracket directly in back of the head. All gears are of steel and the sliding engaging gears and clutches are of three and one-half per cent nickel steel, heat treated and hardened. Through these gears, two speeds are obtained. Reversing gears and friction clutches are mounted in the same bracket. The lever controlling the reversing or tapping attachment is at the lower right-hand side of the head, within easy reach of the operator. The spindle is a forging of high carbon steel. Thrust is taken by a ball bearing. The feed box is a unit mounted on the head, the gears of which are fully enclosed and run in heavy oil. Four feeds are obtained and are marked on a dial in thousandths advance per revolution of spindle. The feed can be automatically tripped at any depth within the traverse of the spindle. The gears are made of

steel except the large spindle gear, which is made of semi-steel.

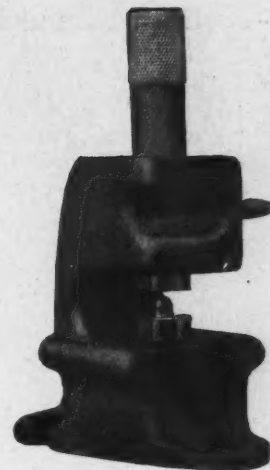
The speed box is mounted on the base. The gears are fully enclosed and run in a light grease or heavy oil. Six speeds are secured, three through the vertical lever on the front of the box and three by the friction lever on the top of the box. This latter lever controls the double friction clutch on the pulley shaft and when in neutral position stops every revolving part except the pulley shaft.

The friction clutches in speed box and tapping attachment are of the expanding ring type. They are of large diameter and wide face and capable of pulling power considerably greater than the capacity of the machine. The bearings throughout are of bronze, lubricated by oil drawn into the bearing by a felt wiper from oil chambers. The motor drive can be arranged either through a four to one variable speed motor connected to the lower shaft by one pair of gears, or constant speed motor in connection with the gear box. Morris drills are also produced in 4 and 4½-ft. sizes.

Specifications of 2½-ft. drill: Drills at base to center of 5 ft.; spindle traverse, 12 in.; spindle diameter above sleeve, 1 9-16 in.; spindle, Morse taper, No. 4; working surface on table, 18 x 18 in.; diameter of column, 11¼ in.; height over all within arm and spindle in highest position, 94¾ in.; motor drive, size and maximum speed, 3 hp., 1200 r.p.m.

Eyelet Forming Tool and Eyelet Terminals

The Eisemann Magneto Corp., 32 33rd St., Brooklyn, N. Y., is producing a device known as the Eisemann eyelet terminal. It is used for all manner of high and low tension electrical connections. It is compact and may be easily attached in close proximity to other terminals or parts without danger of short circuit or other interference.



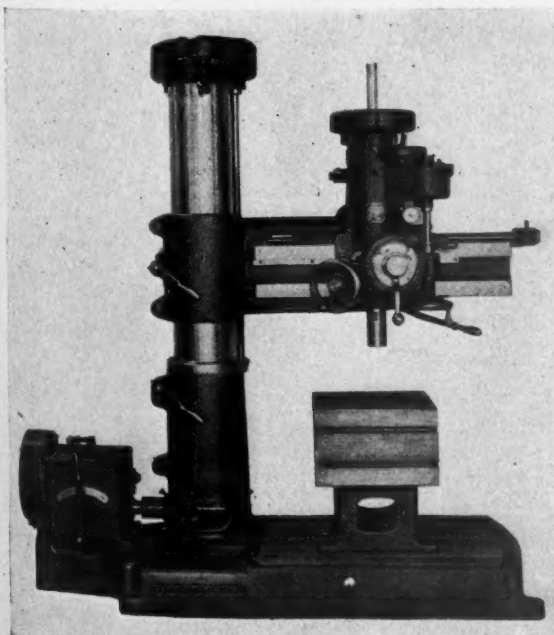
Eyelet Forming Tool

It is fitted with flanges for attaching to a work bench

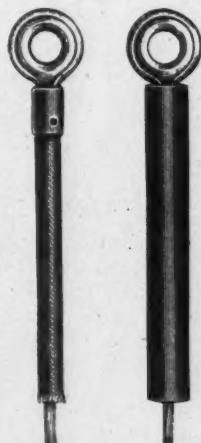
No corrosion of metal parts or rotting of the cable can occur as its construction offsets these detriments. Perfect electrical contact is assured, the wire being pressed into practically a solid unit with the metal of the eyelet itself. This pressure is retained by a substantial form of double crimping. This is accomplished independently of the thickness of the wire. The firm manner in which the wiring is compressed by the forming tool makes it impossible for the wire to pull out, the tool at the same time pressing the surface of the eyelet so as to form an almost flat contact of relatively much larger area. The ring of solid metal prevents it from being accidentally jerked or pulled off the binding post.

The connection with the cable is mechanically stiffened by a reinforcing tongue or extension which is forced some distance into the cable, thus effectually preventing the breakage of the wire by bending sharply near the eyelet. The terminal can also be furnished without this extension for use where the insulation is too compact to allow its insertion. It can be furnished in two sizes, the larger wire having a central opening approximately 13-64 in. in diameter, whereas the smaller one has a hole about 11-64 in. wide. The smaller size is furnished only in the plain style and is used almost exclusively for small braided low extension cable or for bare wire.

The Eyelet Forming Tool is a device designed for use in the garage or repair shop. This tool is of simple but sturdy construction. In producing this tool the aim has been to make an instrument extremely husky and well able to withstand hard usage. It is nevertheless of convenient size, being only four inches in height and weighing only 1½ lb. It is fitted with flanges for attaching to a work bench, may be clamped in a vise or can simply be set on a motor or held in the hand as desired when forming the eyelet. The lower end of the knurled plunger and the base against which it crushes the eyelet form dies of the shapes known as Db and Dp, respectively, in the illustration.



The Morris Drill

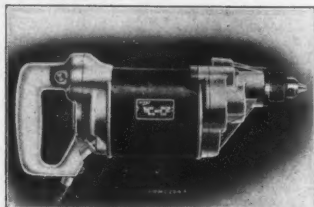


Eisemann Eyelet Terminals

With these terminals perfect electric contact is assured. The wire is pressed into practically a solid unit with the metal of the eyelet itself.

Hisey-Wolf Drills and Drill Stands

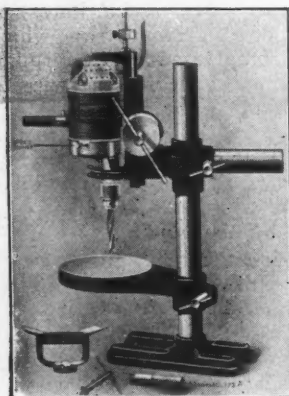
A complete line of electrically operated, ball bearing hand and breast drills, that can be connected by plugging to any circuit, is being produced by the Hisey-Wolf Machine Co., Cincinnati, O. One



Hisey Model 18KU Hand Drill

It has capacity of $\frac{3}{4}$ in. in steel and its speed in r.p.m., no load, is 1200. It weighs 8 lb.

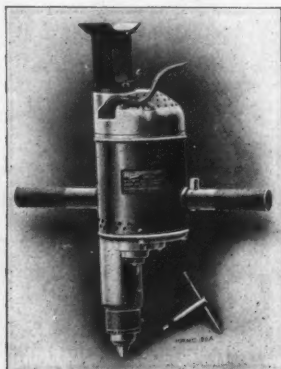
of the hand drill models, illustrated herewith, is known as Model 18 KU. The other model illustrated is the Model 38 KD, which has a capacity in steel of $\frac{3}{8}$ in. This drill is 17 $\frac{3}{4}$ in. long, 4 $\frac{3}{8}$ in. diam. and weighs 17 lb. This machine is equipped with a spade handle, adjustable side handle, 15 ft. of cable and a drill chuck, which holds straight round shank drills from 0 to its capacity.



Hisey-Wolf Drilling Stand

This is Model No. 1 and has a lever feed. This drilling stand is adaptable for $\frac{3}{8}$ and $\frac{1}{2}$ -in. capacity drills

A drilling stand for attaching to the bench that has proven quite a convenient accessory can be obtained for this line of drills. It increases the usefulness of a portable electric drill, giving the benefit of two machines at practically the cost of one. The drill is secured in the stand by



Hisey-Wolf 38KD Drill

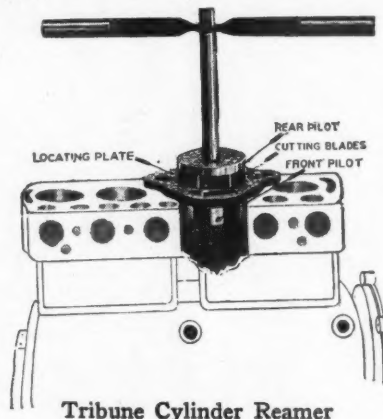
This drill has a capacity of $\frac{3}{8}$ in. in steel and weighs 17 lb.

two hinged caps and lock nuts, quickly attached or detached. The cable and cross arm are adjustable vertically on the main column. Holes can be drilled at any angle. The motor drilling head can be swung in a complete circle parallel to the main column.

Cylinder Reamer for Ford Engines

The Tribune cylinder reamer for Ford engines is a product of the Tribune Engineering Co., Inc., Oswego, N. Y.

The working parts of this are hardened and ground as are the pilots so that constant friction will not wear the parts. This instrument has a locating plate which bolts to the cylinder block, the forward pilot being inserted first to center the cutting blades. The blades cut at the forward ends only, the balance acting as a guide. This reamer for 1-32 .031 sells at \$22.50; any special oversize for the Ford cylinder block can be had at \$25.



Tribune Cylinder Reamer

Lightweight Drill for Close Work

The latest product of the A. H. Petersen Mfg. Co., Milwaukee, Wis., is the Hole Shooter, a small portable electric drill weighing only 3 $\frac{3}{4}$ lb. The exclusive representatives of this product are C. N. and F. W. Jonas, Transportation Bldg., Chicago, Ill.

The unusually low weight of this electric drill is made possible by an improved design and the skillful use of aluminum, of which the entire case and handle are constructed. But it is pointed out neither power, speed nor durability have been sacrificed in obtaining this reduced weight.

Awkward drilling jobs are said to be non-existent when workmen are supplied with this light tool. Because of the light weight the operator does not tire as readily as with a 7 to 10-lb. drill, thereby increasing both accuracy and output. The Hole Shooter also effects a big saving in drill points.

This drill, with its capacity of 3-16 in. in steel and $\frac{1}{4}$ in. in wood, lends itself to a multitude of uses for garagemen, trimmers and body builders. It saves time and work in drilling small holes for installing speedometers, etc., on instrument boards.

The Hole Shooter has a universal motor, operating on either direct or alter-

nating current. It develops a speed of 1600 r.p.m.; it is furnished with either 110 or 220 volt windings. A centrifugal fan keeps the motor cool even under the severest working conditions.

This tool is standardized and all parts interchangeable. Gears are cut from nickel alloy steel, heat treated by a special Petersen process. High grade



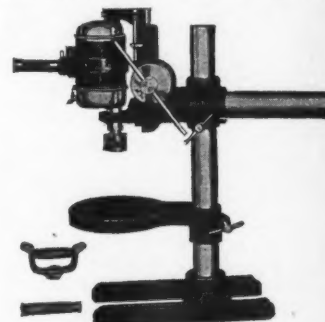
Hole Shooter

It is a small, portable drill weighing only 3 $\frac{3}{4}$ lb. It facilitates work on awkward jobs

ball bearings of surplus thrust capacity carries the front end of the spindle shaft. The spindle is offset for close work in awkward places. A Cutler-Hammer push-button switch located in the upper part of the revolver-like grip gives instant control of the current. The Hole Shooter is regularly equipped with a Jacob's chuck and is furnished with 10-ft. cord and plug.

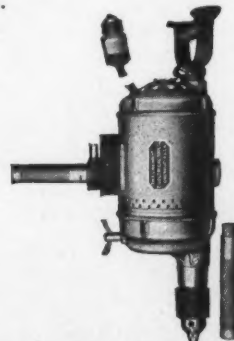
Cincinnati Electric Drills

Of all the products of the Cincinnati Electric Co., Cincinnati, O., the portable electric hand or breast drill of $\frac{1}{2}$ -in.



The Cincinnati Bench Stand With Drill Bracket

capacity is probably of greatest interest to those connected with service station work. This drill has a taper socket instead of a chuck and can be obtained with $\frac{1}{2}$ -in. drills, if desired. A screw-feed attachment can be had as extra equipment. This drill is made in single and two-speed models. It weighs from 18 to 19 lb. The single-speed model has a speed of 450 r.p.m. and the two speed model 450 to 750 r.p.m.



Cincinnati Electric Drill

This drill comes in single and two-speed models, one-half in. capacity

The motor windings are fully enclosed and motors are air-cooled. The gears are made of high-grade steel heat treated. All moving parts are thoroughly lubricated. Annular ball bearings are used on the ends of the armature shaft.

The bench stand has an 8-in. rack and pinion feed controlled by a hand lever, which has a quick return. The drill is locked in the bracket by two hinged caps and thumb nuts. The cross arm of the stand holding the bracket has a horizontal and a vertical adjustment permitting the drill to be turned to any angle desired.

Halburn Adjustable Reamer

An improved valve seat reamer with a wide range expansion, known as the Halburn adjustable reamer, is being manufactured and distributed by the Halburn Co., 317 W. Pico St., Los Angeles, Cal. The cutters of this reamer are quickly adjustable to dimension by turning two nuts. They are then locked in position by turning one of these nuts.

The entire construction of this tool is to give strength. The cutters are made of hardened tool steel. They are slid into



Halburn Adjustable Reamer

This is an improved valve seat reamer with a wide range expansion. Two nuts permit quick adjustment to the desired dimension.

45 deg. slots fitting flush against the solid body of the tool. This arrangement not only brings all the pressure against the solid body of the tool, but also makes it impossible for the cutters to slip out. The effect is the same as a solid tool. Then again as pressure drives them toward the center and as the center stem is solid throughout to give accurate guidance to the cutters, the cutters cannot possibly get out of alignment. The pilot stems are interchangeable by slipping them over the solid stem. A cross bar wrench is supplied so that the pressure is exerted directly over the center of the tool.

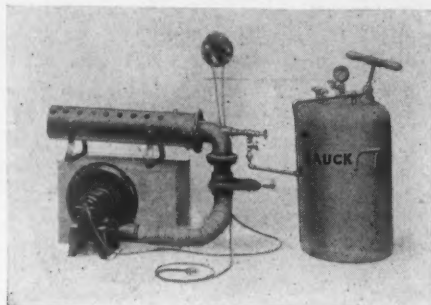
This reamer, which takes the place of four solid reamers, can be lowered through a small port hole and expanded therein.

The base of this tool is 1 1-16 in. The 45-deg. cutters are interchangeable for 30 and 60-deg. and concave cutters and can be supplied at a slight additional cost.

This reamer, supplied in an attractive box with full instructions, is sold complete with two sets of 45-deg. cutters, 5-16, 3/8, 7-16 pilot stems and wrenches at \$12. Extra cutters sell at \$2 for a set of eight, and extra pilot stems, any size, at \$1 each.

Hauck Low-Pressure Oil Burner

The Hauck low pressure type burner, marketed by the Hauck Manufacturing Co., 126 Tenth St., Brooklyn, N. Y., atomizes crude kerosene or refuse oil by a fan blast of 1 1/2 oz. The rate of oil atomization and consumption, depending



Hauck Low-Pressure Oil Burner

upon the amount of heat required, ranges from 2 1/2 to 8 gal. an hour.

The complete oil burning equipment, exclusive of an oil storage tank, consists of a combustion box having flame outlets lined with fire brick, a Hauck low pressure burner with an air supply regulating blast gate and oil regulating valve and strainer, a blower and an electric motor with switch and plug.

The combustion box is designed to retain and properly distribute the heat in the boiler until the fuel has been entirely consumed.

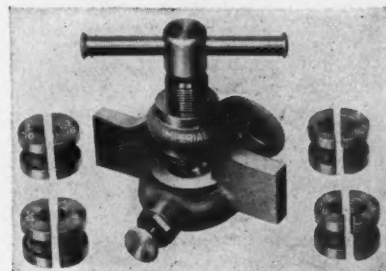
This outfit, complete with 2 1/2-in. blast gate and combustion box without blower, is priced at \$68, and with 3-in. blast gate, \$72. With fan blast blower, electric motor, switch, box, electric cord and plug to make connections to lighting systems, this burner sells at \$75.

adjustable head cutter consisting of six individual cutters all of which are controlled by one adjustment, a bevel pilot head which acts as the centralizing medium and an oversized securing ring which follows the new cut and permits a firm and steady cut are now effectively covered in this improved tool.

Either manual or drill press power can be used to operate this tool. If the cylinders to be rebored are in a removable block the drill press can be used, but if the engine block cannot be removed from the vehicle reboring can be accomplished just as satisfactorily by operating the tool by hand.

Imperial Flaring Tool

A new tool for flaring copper tubing was recently placed on the market by the Imperial Brass Mfg. Co., 1200 West Harrison St., Chicago, Ill. It quickly gives the proper flare and taper to tubing 3-16, 1/4, 5-16 and 3/8 in. outside diameter without any chance of cracking or splitting. It can be used to flare tubing already in place or it can be clamped to a vise in the shop. The price, complete with case, is \$12.



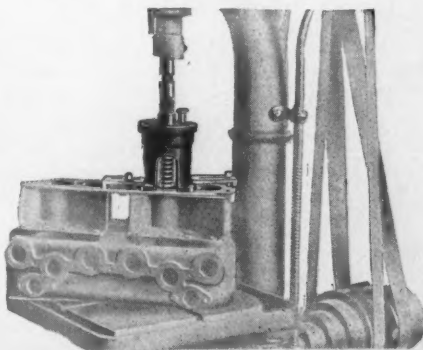
Imperial 75-F Flaring Tool

Above is shown a new tool for flaring copper tubing. It gives the proper flare and taper to tubing 3/16, 1/4, 5/16 and 3/8 in. outside diameter.

Universal Boring Machine

Fundamentally the Universal cylinder reboring machine, now being marketed by the Universal Tool Co., Inc., 435 Woodward Ave., Detroit, Mich., has remained unchanged from the one originally introduced. This more recent design has incorporated in it improvements that make for more accurate work without destroying the simple construction of the tool.

All the points of construction essential for efficient cylinder reboring, such as an



Universal Cylinder Reboring Tool

Machinery Blowing Outfit

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., is now equipping its No. 46 Electric Compressor Portable Automatic Tank Outfit with a reducing valve, hose and blow gun. These new parts make it doubly useful because with them it may be utilized for removing dust, lint, etc., from machinery, while its standard equipment still permits its use for the inflation of pneumatic tires from the smallest to the largest size.

This outfit is mounted on wheels so that, despite its large capacity of 6 cu. ft. of free air per minute, 200 lb. pressure, it can be readily wheeled about by one man. This outfit is also used in connection with any standard engine cleaner by means of which a spray of kerosene oil or gasoline is driven from the jet under high pressure, dissolving the grease and gummy dirt and blowing it out at the same time. This sort of an apparatus is used largely in machine shops, garages, etc., to keep machinery clean and for cleaning gasoline engines.

Selling Farm Electric Lighting Systems in the Garage and Dealers' Field

Why Some Succeed and Others Fail. Information Gleaned From Talks With Parties on Both Sides

By K. HERRICK

THE most successful merchant in any line is the one who visualizes undeveloped markets and is among the first to develop them. At various times manufacturers of farm lighting and power systems have made overtures to garagemen and motor car dealers, meeting them more than half way in an effort to show them that they are the logical merchandisers of such devices, each of them knowing in advance enough about electrical operation and apparatus to undertake the work of selling and service, if not actual installation, without further study. The commercial car agent has his installation plant and service car ready-made, so to speak.

Nevertheless, while this decidedly undeveloped market was visualized by many dealers in commercial cars, automobiles, automotive equipment, and the like, and garage operators, comparatively few have acted upon the possibilities, while others have taken on one farm lighting system or another without making any serious attempt to develop the field. A few, a very few, realizing that selling farm lighting systems is a real business, have gone about merchandising them with just as grim a determination to make good as in their other field.

And so these actually have made good.

Why Ignore Natural Opportunity?

Not infrequently garagemen and car dealers who have "just fussed along" with a farm lighting system department, have had the chagrin of seeing Friend Plumber and Friend Implement Dealer, as well as Friend Electrical Specialty Man get away under their very noses with a rich customers' list which could have been theirs, rightfully, because of practice and equipment.

Garage proprietors usually are salesmen by virtue of necessity and commercial car and automobile dealers generally are considered masters in that line of endeavor. Why, then, should implement dealers, plumbers and electrical specialists beat them to it in getting the farmers' trade?

Nowadays, when farmers are buying improvements for the home and have the money to pay for them all ready under the clock, or in the old family sock, the garageman can sell them tires and equipment for their passenger car, likewise for their truck and parts for their tractor. Then why cannot they sell them at the same time lighting systems for their homes?

Why have some garagemen and car dealers taken up farm lighting systems and finally dropped the line?

After talking the matter over with vari-

ous commercial car dealers, passenger car men and garage owners, the information appears to simmer down to this:

The car dealer, oftentimes, does not apply the same individual and persistent salesmanship to pushing farm lighting, as to pushing his previously established business.

He is prone to look on farm lighting sales as a "side line," instead of as a regular department of his established business; or even as a separate business, as some of the wise ones do. He is apt to forget that persistent field salesmanship must always be the forerunner of any successful business in its pioneering stage.

He will not make a sufficient appropriation for properly financing the farm lighting department and when factory suggestions are made to him, relative to enlarging his stock to a reasonable degree, to make the proposition more attractive to the prospect, adding such things as accessories and "leaders" to the lighting outfit, he does not consider that this means trade development for him, but becomes suspicious that the factory is trying to "unload" merchandise on him.

Then, as soon as a spurt comes back in car sales, he immediately drops the pushing of farm lighting and bends all his energies toward the car proposition. He thought, perhaps, too, that he could make a first class farm lighting system sales force out of salesmen so poorly fitted for the commercial car, or passenger car trade, that he was planning to drop them anyway, but thought he might "stall along" by using them as lighting system men.

They didn't have enough capital at the start to swing the proposition.

It was "too much trouble" to hunt up business.

They were so doubtful and half-hearted about the success of the undertaking that they sent the business to the undertaker.

They wouldn't engage a single extra salesman to push it, even when it seemed to be going well.

The very reason why these types of salesmen—the car dealer and the garage owner—have fallen short are, of course, the reasons for the "you-can-go-hang" attitude that already has begun to be noticed among some farm lighting system distributors toward motor car dealers and garagemen, where, only a year or two ago, they were begging the trade to take it up and circularizing them with expensively prepared literature. At least the manufacturer of farm lighting system devices saw the potentially rich field for car dealers and garagemen and every one

of them had a list of the men in these lines who had more than made good selling their product. But some of them became disgusted that so few in the automotive field seemed to care to take up the proposition and risk a little struggle. Probably not one of these automotive men but had taken much more of a chance when starting to launch his own particular motor car or garage business.

One farm lighting concern has gone so far as to place difficulties in the way of any motor car dealer or garage operator who will not agree, in taking up its system, to make it an entirely separate business from the one he has established. The company deemed its proposition so good and the possibilities so great for a "live" dealer, that it would not tie up with any agent who would attempt to work it only as a side-line, or in a half-hearted way.

This jealous guarding of the field by a few manufacturers and the fact that virtually all of them have fair lists of motor car dealers and garage owners among their agencies—men who have made good—tend to prove that the business is, indeed, worth striving for, if gone about in a business-like manner.

The fact is, that the farm lighting device manufacturer, the motor car dealer and the garageman need one another for their fullest development and for any one of the group to stand aloof when there is good business to be had all around, seems little short of stupid. The fact remains that most farm lighting system men welcome automotive dealers and garagemen as agents if they are willing to treat the business like a real one and to do justice to themselves and the business at the same time.

Restrictions Made by One Company

One farm lighting system company which, from time to time, has had to weed out its too easy-going agents, lays down the following rules for anyone taking on its plants to sell:

Salesmen, whether commercial car, passenger car, garage, or otherwise, but real salesmen, must be maintained exclusively for the farm lighting agency. No "half-time," or filling-in is permitted. A separate sales group is a necessity, even if the "group" consists of one man.

No dealer of any kind who is not financially responsible, or who is venturing "on a shoestring" is made an agent.

Of course, many successful car dealers and garagemen have started on a very small "shoestring" and made good, but this company wants a chance of success for its agents without too long a wait.

It is true, however, that other concerns that are less rigid in their rules, seem to get along with their agents quite as well.

One argument in favor of a separate salesman, or sales force for farm lighting, when farm lighting devices are sold from the same place as cars, or in a garage, is this: There is a tendency, nowadays, to have separate groups of salesmen for trucks, automobiles, trailers, tractors and automotive equipment, to say nothing of tires. That is, many salesmen nowadays are highly developed specialists in a more or less narrow field.

Some farm lighting system device manufacturers say that the very best farm lighting plant salesman is the man who is "caught young" while in the motor car trade.

It is recognized that the truck dealer, the automobile dealer and the high grade garageman are schooled in a clean-cut method of salesmanship.

These men appreciate the value of doing a cash business.

They are used to giving service and keeping owners satisfied, perhaps in a greater degree than any other lines of trade.

Requirements for Farm Lighting Plant Salesmen

It is notable that the car dealers and garagemen who succeed in the merchandising of farm lighting systems are fulfilling the chief requirements of the leading farm lighting concerns, which seem to be about as follows:

The dealer, or agent, must be a man of integrity, unquestioned good standing in the community and in full health and energy.

He must have capital, or financial backing sufficient to operate and develop the merchandising of lighting plants and their accessories, or electrical labor-saving devices.

He must be able to carry a stock, at all times, from which immediate delivery can be made to a purchaser. Otherwise he is not giving service.

He must have the vision to see his own farm field and so equip his business that he can cultivate the farmers who trade in his city, if he does not already know them. He must be capable of going to them at their homes and of demonstrating to them there.

The number of dealers under a distributor usually depends upon the trading centers and the number of prospects. The average is from four to six dealers in thickly populated territory, or one dealer in a county, who is able to organize sufficiently to produce the same business that from four to six dealers would produce.

Most farm lighting concerns maintain a force of service supervisors, or employees holding a title equivalent to this. These men train the dealers and their service men. The dealers' service men usually install the plants for the owners after demonstration and sale.

District supervisors, or their equivalent, constantly travel about for the concern to keep in touch with the service men under their supervision. Sometimes there

are carefully selected field salesmen, of long and successful experience, who are capable of placing the entire proposition before the biggest merchants in the country. Such men usually have the title of district manager.

Upon the appointment of a distributor for a certain territory, the corporation co-operates closely with him to appoint and develop dealers.

Thus it will be seen that the factory gives its immediate subsidiaries careful service. In turn, there is good service and hearty co-operation for the dealer or agent, from the factory.

Here is the usual procedure:

Every lighting plant dealer-agent receives corporation literature of various types, as in the commercial vehicle or passenger car trade. These pamphlets present the dealer proposition, showing the wide, new field for progressive dealers; include, perhaps, an illustrated letterhead giving the specifications of the lighting plant and showing its advantages to purchasers; and various pamphlets and "envelope stuffers" giving the prospective dealer a good idea of what owners think of their plants and the uses to which they put them, priming the dealer to talk farm lighting more effectively. Usually a sales manual, giving the dealer the instructions he will need to start, is mailed to him, or brought to the dealer by a corporation representative when he calls to discuss various phases of the proposition.

This manual ordinarily has a diagram with instructions for installing plants.

While the distributor is giving this service, the factory, or corporation is co-operating at every point of contact. Factory service usually includes doing things for customer and plant that the local dealer or agent and his employees cannot do so effectively.

Corporations find valuable prospects for dealer agencies by:

Consulting newspaper publishers.

Consulting bankers.

Inserting advertisements in trade journals and local newspapers.

By direct mail.

Dealers often are told that it is better to spend three or four weeks getting together the proper equipment and becoming familiar with the details of the proposition, than to start out and immediately attempt to make sales without adequate preparation. It is as important to know the product as it is in the motor car industry.

Some corporations furnish the dealer with a prospect record book in which he is advised to write every prospect's name, address, the road on which he lives, the newspaper he reads, and data about his personal peculiarities and perhaps those of his family and how it is best to approach any of them. It is also quite necessary to maintain a card index system, of the kind well known to all motor car dealers.

The dealer should have a separate file in which to preserve copies of the literature sent to him from the factory, and for letters. Such a filing case should have compartments of various sizes, so that

any type of pamphlet or advertising matter relating to the farm lighting plant can be easily distinguished and selected.

Office equipment for a lighting plant agency should consist of:

A separate index and file for all general correspondence.

A separate index for all correspondence on claims.

A separate file, properly indexed, for all circular letters received direct from the corporation.

A separate file, properly indexed, or chronologically arranged, for all circular letters sent out by the distributor.

A separate index, or file for all correspondence with each manufacturer of accessories, wire and other material with whom the dealer may correspond direct.

A separate file, arranged alphabetically, for a card record of the dealer's farm light prospects, correspondence with each prospect, data being filed under the respective alphabetical index in this file. Should the dealer have his territory divided into blocks of townships, with a salesman over each block, the file should be separated into those blocks and the prospects grouped under each salesman. This plan enables the dealer to check up his salesmen or himself at any moment, to see when the latest visits were made to prospects; what was accomplished and what is necessary to be done—first, to sell a farm lighting system and then to sell, one after another, the various electrical accessories.

A separate file for all orders.

A file for any corporation publication, such as a house organ.

A file for the special sales and service bulletins issued by the factory.

The dealer usually is coached to keep a duplicate record of his prospects, as already mentioned—one in his card index and the other in his prospects' record book.

How to Get a Prospect List

Dealers usually seek a list of live farm prospects in their territory as soon as they have arranged for a show room and equipment. These prospects can be obtained as follows:

From local banks.

From local newspapers

From county agents.

From court house records.

From building information.

From the dealer's own knowledge, observation and acquaintance.

Lighting plant corporations generally supply signs for the dealer's show window, shop front and interior display. Often posters are furnished. These can be advantageously placed where farmers congregate, such as weighing stations, flour mills and grain elevators in the territory. If permission can be obtained, it is sometimes worth while to hang a poster in the post office, in the court house and in banks and general stores.

The lighting plant agent must early decide whether he will do his own installation, including wiring and placing fixtures, or whether he will arrange with some reliable electrical contractor for this work.

Special "Light Opening Days," or "Demonstration Days" are advised, to attract the farmers' attention and gain patronage. The factory usually will furnish specifications and take preparatory steps therefor. Here is one method:

The dealer should select the best date when farmers and their families will visit town. This is usually Saturday.

It is impossible to foresee all conditions, of course, such as rainy days, when farmers will remain at home; but the dealer's experience and consultation with the weather forecaster soon will let him know reasonably well how to gauge the most propitious time for a "Light Opening."

The dealer should obtain photographs of the homes of local owners of farm lighting plants, also of installations, and obtain testimonials from these owners.

The dealer should get out a special invitation letter to the largest possible number of prospects in his territory, announcing date of opening, or demonstration, and emphasizing that a souvenir will be given to every farmer, every farmer's wife and every child who attends. The corporation generally supplies the souvenirs, if not free, at least at a low rate, just as it supplies advertising matter and stationery. The factory should be allowed time to obtain the souvenirs.

The dealer should prepare a large advertisement to appear in one of the local daily, or weekly newspapers during the week of the opening and, if he can afford, the agent might run the advertisement a

day or so prior to the opening, as well.

The dealer should prepare a smaller advertisement to be run during the opening week, in the small country weeklies in other sections of the territory, announcing the opening.

The dealer should have handbills and special posters printed, and mail them to the general stores and to other places in the territory where farmers will be sure to receive them.

The dealers should advertise that there is a rest room for mothers and children on the premises and that all women are cordially invited to make the place their headquarters for the day.

The dealer should have "publicity" stories in the local newspapers two or

three days prior to the opening and he should have badges printed for each salesman and helper to wear at the opening, to make it easy for the farmers to ask them questions on the appliance. Each badge should bear the wearer's name.

The dealer might very well have one or two attractive young women presiding over the counter where the souvenirs are issued and let them be provided with prospect records in which to enter all helpful data about each person interviewed and instruct them to obtain the names of newspapers, farm journals and trade publications he may read. It is a good plan to give a catalog with each souvenir.

The corporation is willing to supply samples of publicity for such occasions.



Four Two-Ton Oshkosh Four-Wheel-Drive Trucks Equipped With Heil Two-Yard Bodies and Special Hydro-Hoists

Model No. 7 Hydro-Hoist has been specially designed for four-wheel-drive trucks. This compact, self-contained unit is simple in design and construction. The gear pump, which operates the hoist, is in front of and integral with the cylinder. Placed on the chassis is a specially constructed hoist frame, which enables the hoist to accommodate itself to possible unevenness in grade at the point of dumping.

Activities of the Motor Truck Association of Philadelphia

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President

W. R. WALTON
Treasurer

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328 N. Broad Street



BOARD OF GOVERNORS

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THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

A MOST encouraging message of optimism was delivered at the monthly meeting and dinner at the Hotel Adelphia, by Wm. H. Hutt, Deputy Governor of the Federal Reserve Bank for the Philadelphia district. A reassuring message was also brought to them by another speaker, Lewis A. Smith, superintendent of the Bradstreet Co., Philadelphia Branch. Both addresses were educational and particularly timely.

Mr. Hutt emphasized the fact that the motor truck industry has not been discriminated against by the Federal Reserve Board or by the banks, and stated that the report to the contrary was erroneous.

Mr. Hutt said in part: "There is no denying that times are trying and affecting every business man, but we should all be careful of rumor and common report, which are so apt to be exaggerated and distorted. The decrease in the purchasing power of money, due to a variety of causes, has had much to do with this unsettled state of mind, while production has increased in the last six or seven

years, it has not increased in proportion to demand, which was stimulated mainly by high wages. Currency in that period increased 70 per cent and bank deposits more than 100 per cent. The increased amount of currency per capita has had the effect of decreasing its purchasing power."

"Why Men Fail," was the topic selected by Mr. Smith. He said that last year was abnormal in the small number of failures that occurred in this country, the number being only 5,515 out of 2,000,000 concerns in business. He said the indications this year were that nearly twice as many firms would fail, due partly to very considerable increase in the number of concerns in business."

A very interesting talk on "The Motor Truck and Transportation" was given by Wm. E. Elliott, advertising and sales promotion manager of the Packard Motor Car Company of New York. He said that the motor truck was not so much an invention as the result of a demand for better transportation and has brought with it improved highways that have developed a more elastic transportation system than

the railroad could provide. He cited the fact that 180,000 tons of merchandise were transported last year by motor truck between New York and Philadelphia, netting over \$2,000,000 revenue, as evidence of the practical efficiency of motor truck hauling between large centers. He said that the use of trailers was adding greatly to the economy of such transportation.

Mr. Metcalf, secretary of the Association, read a communication regarding a New York concern, which was said to be violating the postal laws by addressing motor truck dealers under a misrepresentation in order to secure a mailing list, and warned the members against the proposition.

Arthur Bittong, chairman of the Entertainment Committee, and known as the "Senator from Holland" provided an interesting program of singing and dancing and made one of his characteristic speeches on the affairs of the evening.

Mr. Anthony called for a large attendance at the next meeting in December, at which nominations for the annual election of officers will be made.

A Valuable Sales Campaign That Sold Hundreds of Trucks to Western Farmers

G. A. Gossette, Sales Manager of Wichita Automobile Company, Tells How Farmers Were Interested and Sold Through Advertising and Actual Demonstration on Their Own Farms

By A. V. COMINGS

WHEN a man has a reputation for selling more motor trucks to farmers than any other man west of the Mississippi, it may well be taken for granted that he knows pretty well what he is talking about when he gets up to tell how it is done. This is the reputation back of G. A. Gossette, sales manager of the Wichita Automobile Co., of Wichita, Kas., who recently talked on this subject before members of the Automobile Trade Association of Kansas at their annual meeting at Salina. His talk, together with the exhibits he placed at the disposal of the delegates, was an exposition of one of the best truck selling campaigns with which I have ever come in contact. The methods pursued in the field, the circulars and letters backing up the salesmen, and the advertising matter carried in the newspapers throughout the territory, all show a very intelligent understanding of the way to reach the farmer, and the results achieved prove that the plan stands the acid test, which is, "does it produce results?"

Success in Two Respects

The territory over which the Wichita company distributes Reo trucks covers southern Kansas, a large part of Oklahoma, Texas, Colorado and Wyoming, a very fertile field in which to work. Not only in the direct sale of trucks, but in securing dealers, this campaign carried on by Mr. Gossette has been very successful. Mr. Gossette said:

"Gentlemen, my subject for the meeting is, 'How to put the Farm Truck Over,' but first I want to apologize to you for the continual use of the words, I, we, and the Reo Speed Wagon, but the only way I can handle the subject intelligently is to cite you personal experience.

"In 1914, the Reo Motor Car Company, for whom we, the Wichita Automobile Company, are distributors, built their first Speed Wagon—built it because of the growing demand for a light, strong, speedy truck to handle loads up to a ton, and to solve the problem of prompt, dependable delivery at a minimum expense. We placed a truck here and there over the territory with business and oil firms, little realizing until the year of 1917, its value to the farm and the tremendous sales field it opened. Our first move was to call in all salesmen and territory men and after a thorough discussion of the matter, decided to place territory men in the field with truck demonstrators instead of touring cars. This we did. We equipped the Reo Speed Wagon chassis with cab, sills, windshield and an 8-in-1 body, the only body at that time we thought would sufficiently interest the farmer to get him to buy.

"Dealers as a whole were pessimistic regarding the truck adoption on the farm, so it became a case of 'Show them what the truck would really do.' We would pick a community with farms averaging 160 acres and patrol that section until we would find a man threshing, or with corn, oats or stock of any kind to haul, and make him a proposition to haul his goods to market or wherever he wanted it hauled. If he would ride with us to get an idea of how easily the truck handled the load, we here and there managed to place a truck with a farmer.

"That winter we had each dealer send in a list of names of farmers, owning or farming 160 acres or more, in his territory, together with their addresses. We circularized these farmers with circulars and letters of all kinds. We got letters accompanied by pictures from farmers owning trucks, with their cost and upkeep, also telling us why they liked the truck, how many horses it displaced, the amount of feed it saved, and about how long it took the truck to save its original cost.

"The spring of 1918 opened with a good, brisk business from the farmer. That summer we averaged about four trucks a week to the farm alone. The following winter we followed the same tactics regarding advertising that we did in the winter of '17.

"The spring of 1919, business with the farmer opened with a smash that even surprised the most optimistic of us. It was almost impossible to keep the trucks coming in from the factory fast enough. The winter of 1919, we continued our advertising campaign only harder than ever. 1920 business regarding farm trucks was far beyond our most sanguine expectations.

Illustrates Truck Performance

"We publish about once every two months, our Reo Bulletin, showing pictures of trucks with loads, and letters from their individual owners, with always a meaty little article in the most conspicuous place. We also use a pamphlet which shows our 4-in-1 body that met with quite a bit of favor. The pictures are all actual photographs taken on our sales floor and in the field. Another pamphlet we use shows the 8-in-1 body and the old style Reo express body with the home-made grain boards, which gave us the idea for the Reo standard body which we now have. Still another booklet is an advertisement gotten out by the Reo Motor Car Company. In it are letters from farmers all over the country, showing what their trucks are costing and its various abilities in general.

"It is the continual hammering home of sales arguments that we have found to be

facts, that has made our advertising campaign such a success. The same success can be had by any other make of truck, using the same methods or similar ones.

"But back of all our sales arguments, paper and verbal, stands the one big thing that helped us mightily to put the truck across. That is 'Service.' How many, many times the word, service, is abused.

"What we mean by service, is the ability to deliver to the owner of a truck, any part or parts he needs at a moment's notice. When an order comes into our parts room for truck parts, that order is filled immediately. When a truck comes into our repair shop for repairs, passenger cars must wait, if necessary, until the truck is repaired, and ready to go. A truck, we figure, is an investment made by the buyer and every minute it is out of service during the working day, he is losing money.

All Trucks Under Surveillance

"Our territory men pay close attention to the trucks operating in their particular territory. If the truck, whether it is old or new, needs repairs, the owner's attention is immediately called to it and the truck is taken to the nearest Reo Service Station. We believe that if your teeth are bad, go to a dentist; if you are sick, to a doctor; if it is a Reo Truck, take it to a Reo Specialist, but see that it gets service. Look after the small adjustments that the ordinary buyer overlooks. We find it is a very paying proposition for our shop foreman to make a trip about twice a year over the territory, going over the parts that the dealer has in stock to see that it is well balanced, and to look over any particular car or truck that should happen to be giving the local man trouble.

"The truck business hasn't been scratched yet. It's a good, clean business proposition. There are few trade-ins, and your money is sure. It is simply a question of, get out and work. Advertise consistently and steadily and service each truck as it should be serviced with a conscience.

"We keep our parts department well stocked and up to the minute in every sense of the word, carrying parts for cars dating as far back as 1910.

"Our shop equipment is of the best, and there is plenty of it. We have shapers, lathes, Marvel boring machine, drill presses, and grinders, a ninety-ton press, connecting-rod aligner, every special reamer known, micrometers up to 6 in. In fact, we have made every possible provision to give service on cars and trucks. We make service our big sales argument. We are now carrying around \$100,000 invested in parts alone. Our slogan, 'Reo

Service is Real Service,' means just what it says; hard persistent work, no details too small to overlook; eyes to the front and never backward; advertising that goes direct to the prospect and in language and figures that he can understand, and as I said before, Real Service has given us the start we now have.

"If you are selling Fords, Maxwells, Oldsmobiles or any other truck built for farm use, the business is waiting for you—big business, but you must get out and find it. The day is past when the farmer will come in and lay the order on your desk, but when you sell him, keep him sold. There are a thousand and one ways to do it. For instance, when it is necessary to give a new truck owner a little free service, give it with a smile and make him feel that you appreciate the fact that he has shown you the particular part or parts that need adjustment. We are believers in only a reasonable amount of free service. If you buy a suit of clothes from a tailor, he will possibly sew a button on for you once or twice, but if you tear or burn it you don't expect him to replace the suit. Real Service means to us, as I said once before, having the parts in stock ready for the customer. We think that is our best bet and play it strong.

"Another thing. Don't, for a minute, expect that your salesmen are going to sell trucks to the farmers if they've got on a stiff collar. The only way to sell trucks to the farmer is to wear working clothes, and get right out and work with him and show him what the truck will do for him on his own farm.

"Nothing will convince him that he can't afford to be without a truck quicker than to do some hard job better than he could possibly do it with horses. Take hauling wheat from a thresher, for instance. More than once I have hauled

the wheat from a thresher with one Reo Speed Wagon, putting an ordinary wagon under the delivery spout while I was away with the load, and then shoveling the wheat from that wagon into the truck, the fifteen or twenty bushels that had accumulated while I was away with the load. It was hard work, usually on a burning hot day, and I was covered with sweat and dust, but it sells trucks almost every time, and that's what we're in the business for.

"You've got to get right out and work, if you want to sell the farmer, but there is no better buyer if you will only convince him on his own class of work that the truck is an absolute essential.

"Government reports show that there are eighty thousand trucks in use on farms today. With a potential market for 3,000,000 trucks, which is steadily increasing, there is plenty of good business for all of us. Let's go get it."

The newspaper advertising campaign used by the Wichita Automobile Company to back up the salesmen's work is worthy of special note. Their advertising copy was gotten up by specialists in Wichita, and the appeal of both the pictures and the reading matter is such that the farmer can not fail to see and read it.

These advertisement plates are made up in convenient sizes for use in the country papers, and were used very generously all over the territory.

In looking these over it is easy to see why the farmer is interested. They appeal to him in terms of saving money through the very things in his daily life that cost him money. For instance, take this one:

A picture of a truck load of hogs, just ready to go to market, and the heading of the reading matter is "Eliminate Shrinkage." He is interested immediately, and he reads on, and is interested to the point

that the salesman finds him a ready prospect.

Another one starts off: "Gasoline is cheaper than Hay and Oats," and immediately he reads further to see why, and gets interested in trucking. "Attending Sales" is another caption, with the speed wagon bringing home a horse from the sale. Every advertisement speaks to the farmer from his own experience, and that is the kind of farmer advertising that gets results.

The Bulletin which Mr. Gossette speaks about is a sheet large enough that folded twice it goes in a large size envelope. It has pictures of Reo trucks actually in use in the territory, loaded with stock, or farm products or with something pertaining to the farm. The owners' names are given, and their experience with the trucks, told in their own language. Will the prospect read this kind of circular? You bet he will. And does.

For he is interested in what his neighbor is doing.

In another of these circulars, there are, on each side of it, three separate columns, with the picture of a different truck at the head of each, and a letter from the owner beneath each telling what he thinks of the truck. The heading of each column is "What Your Neighbor Says." Can you beat that for getting the eye of the farmer? And at the foot of each column black type says "Buy Now." That plants the seed.

Another circular shows the four-in-one body in all its various shifts, with a clear description of each. That is a good selling argument, for the farmer has a wide variety of uses for his truck.

Taken all together, the sales campaign put on by these truck distributors in Wichita is well worth emulating in other farming districts, for it is a result getter from beginning to end.

Truck Load Balancing Has Been Neglected

Need for Exercising More Care in Truck Loading to Prolong Truck's Life

Much has been said and much accomplished regarding the common evil of

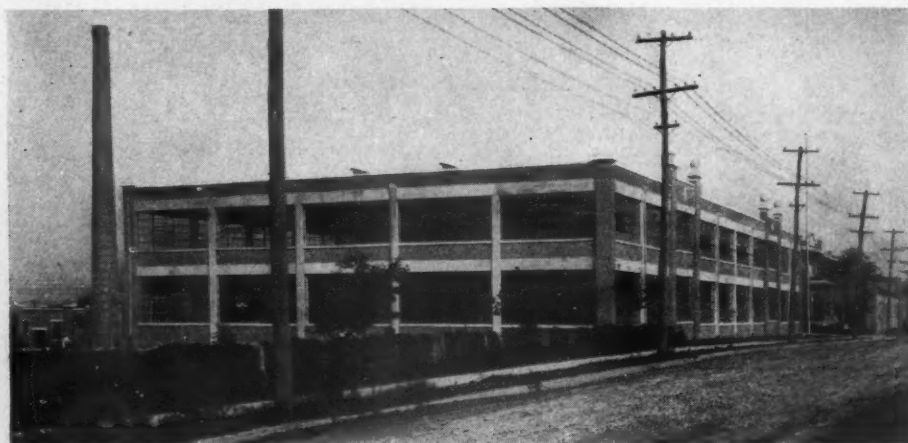
truck overloading but little has been mentioned relative to truck load balancing. The arrangements of loads on truck bodies in such a way that a greater amount of weight rests on one side than on the other is bound to have a depreciating effect upon truck frames causing

spring weakening and chassis strain.

Although very few tests have been made to prove these assertions, the conclusion is obvious and need not be attempted empirically. It is safe to assert that ill balanced loads are the direct cause in many cases of spring leaf cracking.

If more attention to proper loading were paid by fleet owners the result would be surprising. We do not mean that time and labor should be wasted at the loading point to have the goods to be hauled, placed in the right position on the truck. There can be however care exercised by the truck master or the truckmen that the loads are evened up on both sides of the truck body so that there is no listing. A little care on the part of the truckmen will greatly aid this matter without the sacrifice of needless labor.

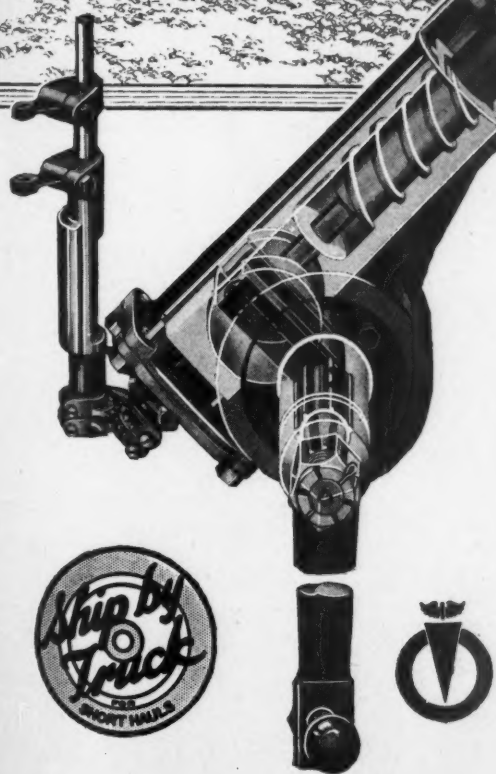
The campaign against this evil should originate with the dealer who should educate his customers to exercise greater care in truck load balancing.



Concrete and Steel Building Recently Completed for the Bearings Company of America, Lancaster, Pennsylvania

With the addition of this new unit the Bearings Company of America has increased its capacity about 50 per cent in the production of its well-known products, Thrust ball bearings and "Star" ball retainers. The new power plant of this company can be seen in the background of this illustration.

What is said to be the largest battery service station in the world has been opened by the Vesta Battery Corp., at 29th Street and Michigan Avenue, Chicago. The building measures 145 x 180 ft.



Building Its Own Road Bed — to Haul America's Freight

The transportation problem of America will eventually be worked out—not on steel rails only, but on hard pike roads; not with engines and box cars only, but with motor trucks and trailers. This means more roads—better roads. The motor truck is today helping to build better roads that it may use them to the benefit of the community.

Ross Steering Gears are playing an important part in this work. The exclusive screw and nut design provides an enormous bearing surface. This bearing surface, in turn, means greater efficiency, greater safety and reliability, and easier steering—both in the motor trucks that are employed in building the road-bed and in those which later will haul freight and express over it. Ross Gears are now standard equipment on 418 different truck models from 165 different manufacturers.

Further Information Furnished on Request

ROSS GEAR & TOOL COMPANY
760 Heath Street Lafayette, Indiana, U. S. A.

ROSS STEERING GEARS

THE STEERING GEARS THAT PREDOMINATE ON MOTOR TRUCKS

Motor Truck Belt Line Replaces Freight Shipments

WITH a railroad switch track at the factory door and shipping almost entirely in wholesale lots, the idea of employing a motor truck would seem rather remote. Such was the case of the Luger Furniture Company. One factory is located at Minneapolis the other at North St. Paul, 22 miles distance. The North St. Paul factory had been making all shipments by rail to the Minneapolis factory.

This procedure had its disadvantages. The furniture had to be crated just as carefully as though it was going on a 1000-mile journey, and had to be shipped in carload lots. Not only was the time element, the shipping time consuming ordinarily four days, a serious cost consideration, but additional losses were sustained through more or less breakage on account of the way the furniture was banged around during the many switchings. More than once, too, orders were lost amounting to thousands of dollars because it took so long to get goods in from North St. Paul. Yet they had excellent shipping facilities and the freight rates were low.

Two 2½-ton Selden trucks were installed on the work and the results have been surprising. They are used on interplant hauling first, then whatever else there is to do. They can, with trucks, ship any quantity of furniture at a time and guarantee delivery within three hours. The whole cost is higher by truck but the time saving is very valuable and there is no breakage.

These trucks are kept at the St. Paul factory and make three trips a week to

the Minneapolis plant. Other days they usually deliver to retailers in the Twin Cities.

The trucks have proven a salvation in many emergencies. Occasionally one factory is in a hurry for some special lumber. The other factory has a good supply or they might have to get what is needed from a lumber yard. In either case a quick trip can be made. If they had to wait for freight delivery, the lack of necessary raw material might easily cause a serious curtailment in production. This is particularly true at the North St. Paul factory which is a considerable distance from any immediate source of supply.

The operating cost of the new truck purchased last spring based on the National Standard Truck Cost System is \$16.70 per day for an average of 50 mi. It was put in operation May of this year, and had worked 75 days to August 1st, traveling 3750 mi., or an average of 50 mi. a day.

Taking several bigger days from their records, we can find even better results. Here is one on which the truck made 62 mi. on two 31-mi. trips hauling a capacity load of 2½ tons one way, each trip returning empty. The cost for that day was \$18.90 which gives a cost per ton of \$3.76. As a load was hauled only one way, the entire result obtained would be 77½ ton-mi. as obtained by multiplying the average loads hauled by one-half the total miles traveled. This would mean a cost of but 24 cents per ton-mi.

These costs have been entirely satisfactory but reasonable costs are not the only

basis for the satisfaction of this company. The introduction of the trucks have solved a serious problem, by linking up their manufacturing process so effectively that the production of the whole organization has been greatly increased.

It would seem that there is a very good lesson here for many other companies. In expanding, a company desires to keep their new plant as close to their main plant as is possible. This often means purchasing real estate at inflated values. But if the experience of the Luger Co. is taken as a lesson, the branch factory can be located quite a distance from the main factory, in fact, out in the suburbs where real estate would be cheaper. Then the two factories can be linked up with a belt line and worked as smoothly as though they were side by side by the utilization of trucks.

Again many companies hesitate to locate any factory any distance from the source of supply, yet with good motor trucks in their service they would be able to locate the factory where cheaper real estate can be purchased and especially in smaller towns where a better class of labor can be obtained. With the motor truck, supplies can be always speedily supplied in case of emergencies. Shipments can be made direct in less time than by the freight and much better results be secured all around.

It might be interesting to study the various items making up the cost of operation on the trucks of the Luger Furniture Company. The costs are given herewith including a few items which are also recorded such as mileage, gasoline and cylinder oil consumption.

Two and a Half Ton Truck

Period Covered	3 months
Days Operated	75
Mi. Traveled	3750
Gasoline—Gallons Used	600½
Cyl. Oil—Pt. Used	200
Mi. Averaged Per Day	50
Mi. Per Gal. of Gasoline	6.2
Mi. Per Pt. Oil	18.75
Investment	
Chassis Complete	\$3500.00
Body	125.00
Painting	40.00
Total Investment	3665.00
Tire Value—Pneumatics	673.60
Total Less Tires—To be Depreciated	\$2991.40
Fixed Charges—Yearly	
Interest on Total Inv. @ 6%	\$ 219.90
Taxes and Licenses	1.65
Insurance	80.00
Garage Expenses	120.00
Total Per Annum	\$ 421.55
Total Per Month	35.13
Total for Period 3 Mo.	105.39
Variable Charges—Period	
Fuel at 30 cts. Gal.	\$ 180.15
Cyl. Oil at 7½ cts. Pt.	15.00
Tires—3,750 Mi.	315.75
\$673.60—8,000 Mi. Life	
Depreciation—3,750 Mi.	186.75
\$2991.40—60,000 Mi. Life	
Maintenance and Repairs (Est.)	75.00
Driver's Wages	375.00
Total Variable Charges	\$1147.65
Total Fixed Charges	105.39
Total Operation Cost	\$1253.04
Daily Costs	
Cost Per Day Operated	\$16.70
Cost Per Mile Traveled334
Repair Cost Per Mile—Est.02
Repair Cost Per Mile—Actual012



This and Another Truck Link Up the Two Distant Factories of the Luger Furniture Co.



Is there one *best* truck?

The Repairman's Answer

Is there a real difference in motor trucks?

Do some motor trucks go along "on their own," month after month, with scarcely the tightening of a bolt, while others seem to be in the repair shop most of the time?

Any repairman can answer. And he is the one man who *knows*.

Go to any Atterbury Service Station. Ask the question for yourself. The answer will show that Atterbury trucks are delivering a rare quality of service, will add to your conviction that there is no better motor truck built today.

The Atterbury franchise is one of the most valuable in the entire industry. Investigate it for yourself.



Overheard in the Service Station

"lo Bill. Where you been for a month?"

"Runnin' the old boat the same as usual. Why, where did you think I'd be?"

"Well, I never see you in here. Who's doing your repair work?"

"Repair work! We don't have no repair work. This is an ATTERBURY!"

ATTERBURY MOTOR CAR CO.
BUFFALO, NEW YORK

ATTERBURY

MOTOR TRUCKS OF MAXIMUM SERVICE

Metal and Rubber Markets

Steel Situation Generally Quiet

Dull trade is reported in the East, though a few small orders placed here and there by brokers acting for exporters prevent absolute stagnation. Exporters say that promising outlook is presented by foreign trade, particularly with Mexico where a latent demand is foreseen. Domestic buyers are said to be marking time, waiting for the lowest prices obtainable.

Steel Products Prices

Per ton—Pittsburgh—	
Bessemer billets	\$50 00 a
Open hearth	50 00 a
Forging billets	60 00 a
Sheet bars	52 50 a 55 00

Sheets

The following prices are for 100-bundle lots and over f.o.b. mill:

Blue Annealed Sheets—	
Pittsburgh (base)	4 50 a 4 75
Philadelphia	4 85 a 5 10
Chicago	4 88 a 5 13
Galvanized Sheets of Black Sheet Gauge—	
Pittsburgh	6 90 a 7 25
Chicago	7 28 a 7 63
Tin—Mill Black Plate—	
Pittsburgh	5 50 a 6 00

Tin Plate

Tin plate, per base box.....	7 00 a 8 00
Terne plate, I. C.	7 05 a 8 25
8-lb. coating, per package....	6 90 a 8 10

Structural Material

Structural shapes, Pittsb'gh .	2 75 a 2 85
Structural shapes, Phila.	3 10 a 3 20
Structural shapes, N. Y.	3 13 a 3 23

Finished Iron and Steel

Steel hoops and bands	3 70 a 4 00
Tank plates, Pittsburgh	2 85 a 3 00
Tank plates, New York	3 23 a 3 38
Steel bars, New York	3 28 a 3 38
Steel bars, Pittsburgh	2 90 a 3 00
Rails — Standard Bessemer	
sections, mill	55 00 a 60 00
Stand., open hearth, mill.....	57 00 a 62 00
Light sections—25 & 45 lbs....	3 00 a 3 25

Iron and Steel at Pittsburgh

Bessemer iron	41 96 a
Bessemer steel, f.o.b. Pitts....	50 00 a
Skelp, grooved steel	3 25 a
Skelp, sheared steel	3 25 a
Ferromanganese (80%)	135 00 a155 00
Steel, melting scrap	22 00 a 23 00
Steel bars	2 90 a 3 00
Wire rods	70 00 a
Iron bars	4 00 a 4 50
Plain wire	3 75 a
Plain wire, galvanized	4 25 a 4 70
Cut nails	6 00 a 6 25
Wire nails, Pittsburgh	4 25 a
Steel hoops	3 70 a 4 00

OTHER METAL PRODUCTS.—Following are the prices current for brass and bronze products:

Copper sheets, not rolled.....	\$23 50 a
Copper bottoms	32 00 a
Seamless tubing, bronze	29 50 a
Seamless tubing, copper	27 00 a
Copper rods	21 75 a 22 50
Copper wire	17 00 a 17 50
Cut and sheets	10 75 a
High brass wire	22 75 a
High brass sheets	21 25 a
High brass rods	19 25 a
Low brass sheets	23 00 a
Low brass wire	24 00 a
Low brass rods	24 00 a

Nickel silver, 18%	35 75 a
Brazed tubing, brass	35 00 a
Brazed tubing, bronze	39 75 a
Brazed tubing, copper	39 75 a
Seamless high brass tubing ..	26 00 a
Seamless low brass tubing ..	28 00 a
Sheet zinc	11 50 a

Miscellaneous Metals.

ANTIMONY.—A leading importer on Wednesday discounted the reports that antimony was available at 5½c. He said the lowest price is 5¼c with more holders asking 6c. W. C. C. brand is selling at 8c. London is unchanged at £47.

GRAPHITE.—Market dull. Consumers continue ordering only for immediate needs and tonnage is dwindling. Slight price concessions have not moved buyers to place advance orders. Current quotations are as follows: Crude Mexican ore \$34 per ton, New York; Korean 2⅞c per pound; Madagascar 5¼c; Ceylon 3¼c to 13c.

MANGANESE.—Absence of business makes prices nominal. Few quotations are heard.

TUNGSTEN.—Large interests say ore buying by steel makers is at a standstill. Buyers will not consider any price. Consumers won't increase inventories. The market is nominal at recent prices.

OLD METALS.—The only demand for scrap metal is for No. 1 machinery composition, consumers asking for large quantities at 13½c f. o. b. cars, but dealers ask 13¼c. Little is available below 33c. Following are prices f. o. b. cars, New York:

Aluminum—	Buying.	Selling.
Cast scrap	17 a17½	18 a18½
Sheet scrap	16 a16½	17½a18
Clippings	18½a20	21 a21½
Copper—		
Heavy machinery comp..11½a11¾		13½a13¾
Heavy and wire	10½a11	11¾a12
Light and bottoms	9¼a 9½	10 a10½
Heavy, cut and crucible..11½a11¾		12½a13
Brass, heavy	6 a 6½	6¾a 7
Brass, casting	7 a 7½	7¾a 8½
Brass, light	5¼a 5½	6 a 6¼
No. 1 clean brass turn'gs. 5½a 6		6½a 6¾
No. 1 comp. turnings.... 9½a 9¾		9¾a10¾
Tea lead	3½a 3¾	4¼a 4½
Lead, heavy	5 a 5¼	5½a 5¾
Zinc scrap	4 a 4½	5 a 5½
Solder joints	8¾a 9	9½a10
New zinc clippings	5 a 5½	5¾a 6
Pewter dishes	23 a24	25 a26
Block tin, scrap	30 a31	33 a34

Rubber Market Firmer. Covering by Short Interests Causes Some Advance

A decided improvement in the tone of the market for crude rubber prevails. Fundamental conditions have not apparently changed for the better.

Para—Up-river, fine	20½a	21
Up-river, coarse	14¼a	..
Island, fine	18½a	..
Island, coarse	14 a	..
Caucho ball, upper	15½a	..
Caucho ball, lower	10 a	..
Cameta	14 a	..
Plantation—First latex, crepe...	20½a	..
Brown crepe, thin, clean.....	16 a	..
do do, rolled	15 a	..
Smoked ribbed sheets	19 a	19½

Centrals—Corinto	14 a ..
Esmeralda	14 a ..
Guayule, wet	24 a 25
Balata, black, Ciudad	*72 a ..
Balata, block, Panama	*50 a 51
Balata, sheet	*1 00 a ..
Mexican—Scrap	*22 a ..

*Nominal.

Scrap Rubber

Boots and shoes	4 a 5
Arctics, trimmed	3 a 4
Rolled, brown crepe	15 a ..
Smoked, ribbed sheets	18 a ..
Arctics, untrimmed	3 a ..
Tires—Automobile	1 a ..
Bicycles, pneumatic	1½a ..
Hose, steam, fire a 1¼
Inner tubes, No. 1 a 9
Inner tubes, No. 2 a 6

Remarkable Performance of Motor Trucks Convince Western Farmers

The possibilities of modern pneumatically equipped motor trucks on the farm were demonstrated recently to 25,000 Colorado farmers when a motorcade of 20 trucks of various makes invaded eleven agricultural states on a two weeks demonstration tour of 750 miles.

The trucks of the caravan averaged 750 miles—a distance equal to the entire tour—while doing demonstration work on the farms. Half a million ton miles of freight were hauled free for the farmers.

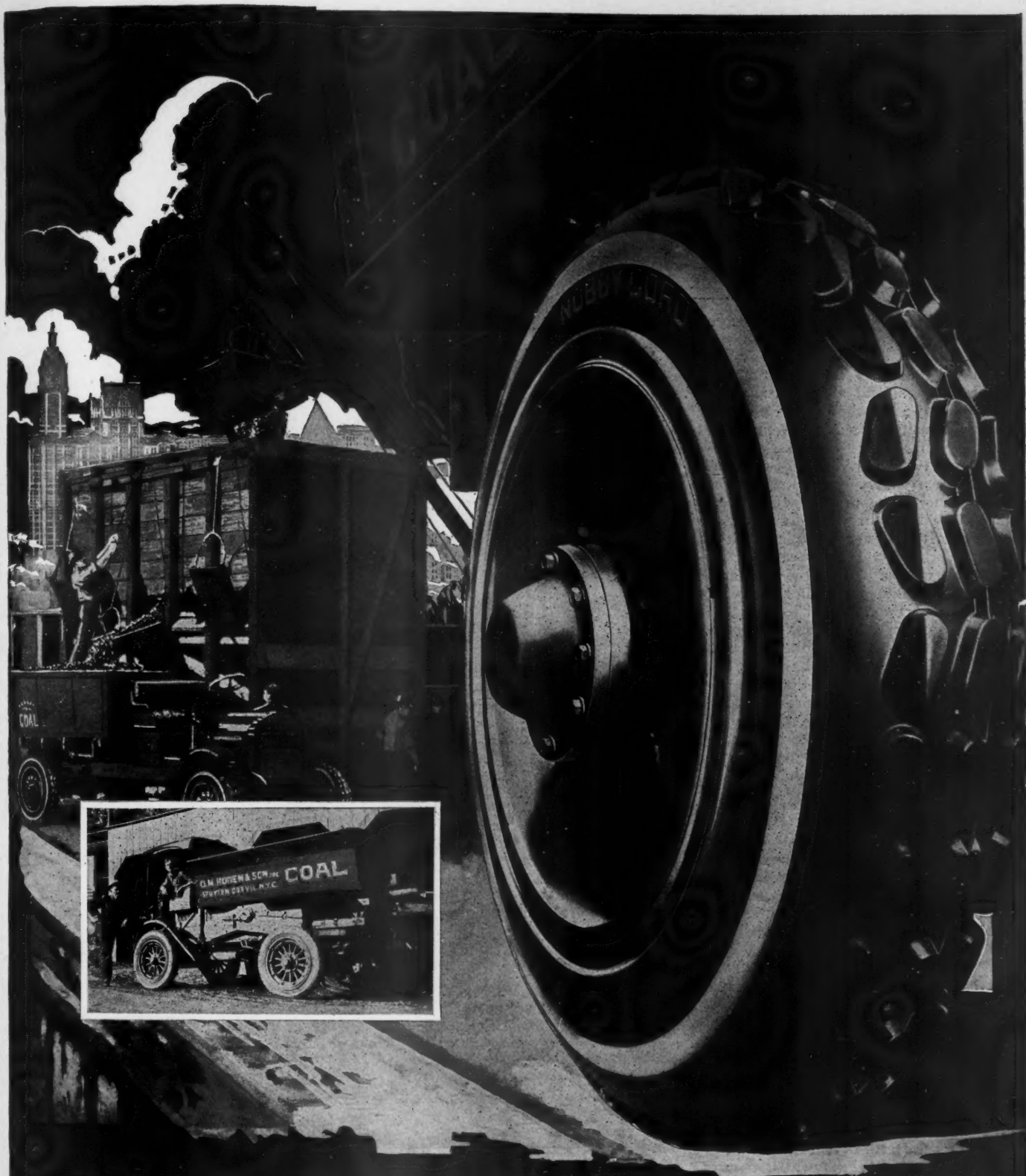
The Rocky Mountain Trade Association under whose auspices the tour was made after having been promoted by farm development experts of the Goodyear Tire & Rubber Company, challenged farmers along the route to produce a hauling job the trucks couldn't handle. Farmers accepted the defi—but couldn't "stump" the trucks. The big freighters performed amazing hauling feats.

Picking their way across ploughed fields with positive traction, the powerful trucks carried big loads of grain from combines and threshers direct to elevators miles distant, performing in from one to three hours hauling jobs that would have taken horse teams a full day to accomplish. Live-stock, lumber, coal, barley, rye, oats, wheat, potatoes, cement, shingles, plaster, kerosene and even church pews were transported between farms and railroad shipping points. In many cases loads handled by these trucks in a few hours over distances as great as 30 miles would have kept all the farmer's horse equipment busy for days.

Bad weather turned dirt roads into seas of slippery mud, but despite this handicap, the motorcade maintained its schedule from county to county without losing a single truck. In addition it pulled out many touring cars that had mired or slid off the road.

Cordial receptions were given the caravan everywhere and intense interest was shown by farmers in both actual demonstrations and in talks and motion pictures showing the advantages of pneumatically equipped motor trucks on the farm.

While a rule of the tour prevented the sale of trucks during a purely educational enterprise, more than 50 trucks were sold in the wake of the motorcade.



AFTER seven months' experience with a set of 36 x 6 'NOBBY CORD' tires on one of our Autocar coal trucks, we are convinced that they are indispensable," writes G. M. Roden, Spuyten Duyvil, N. Y. "Without even a puncture these tires have averaged 1500 miles per month and reduced gasoline and oil consumption 25%."

For all heavy hauling, 'NOBBY CORDS' decrease operating costs and increase delivery speed.

U.S. Pneumatic Truck Tires
United States  Rubber Company

Discussion of Truck Tank Designs*

By F. A. BEAN, Consulting Engineer Wayne Oil Tank & Pump Company

PROBABLY no phase of the rolling equipment design has been as little understood as that of the tank, its cradles and other accessories.

This has lead to an overload being carried by gasoline trucks in a great many cases. One of the reasons is that both truck manufacturers and tank builders have not carefully enough considered the question of the pay load and body allowance in relation to the actual body in question on the particular chassis on which it is to be attached. The weights of finished tanks usually overrun very materially the estimated weight and also the weight of the body allowance; the overload in some instances actually exceeding seventeen and a half per cent.

There are two other causes of overloading that are squarely up to the oil companies. One is the practice of taking a tank off a chassis for which it may have been properly designed and placing it on another truck of the same carrying capacity but with a less body allowance, different frame dimensions and a different distribution of the load. The second is the practice of buying a chassis and tank which has been designed to carry a capacity load in the tank and without any provisions for can racks on the sides, and after the tank has been in service, building on the can racks to carry eight to twelve ten-gallon milk cans filled with lubricating oil, thus overloading in some cases as much as twelve hundred pounds.

Determine Capacity to be Used

In considering the capacity of tank to be used on any chassis, the first question to be decided is whether the truck will be required to carry lubricating oils, kerosene, etc., in milk cans in addition to its regular load. If so, the amount and weight should be carefully calculated and the tank capacity figured accordingly.

The truly cylindrical type of truck tank is not being used as much at the present time as it was previously on account of the wasted space on the bed of the truck and the raising of the center of gravity, although from its shape it is well suited to resist strains caused by wrenching on the chassis during regular service and from accidents. The two most popular as well as the most practical types of tanks for truck service are the oval or elliptical tank and the semi-rectangular, or a tank with a square bottom and sides and a slightly arched roof.

The semi-rectangular type of tank is very popular with a great many oil companies even though it requires more metal and consequently more weight for the same gallonage. This type, allows of a slightly better distribution of the load, has no waste room on the chassis and lowers the center of gravity. The oval tank when used must be covered over or floored to protect the tank from mud splashing. This type, however, can be

more easily drained. When considered from every standpoint the oval or elliptical tank has slightly more points in its favor than the semi-rectangular tank.

Overloading is the fault of everyone connected with the design and purchase of the completed truck. The oil companies do not completely equip their trucks at the outset and both they and the truck manufacturer fail to give to the tank designer the total weight of accessories to be used, which weight must, of course, be deducted from the combined weight allowable for body and load. The designer, on the other hand, fails to thoroughly investigate the various weights to be added with the result that a very undesirable overload occurs.

What is a Standard Chassis?

The N. A. C. C. has adopted the following definition for a standard chassis for gasoline commercial vehicles:

"A standard chassis of a commercial vehicle to be propelled by an internal combustion engine shall consist of an assembly of all essential parts of a truck chassis with protective housings, ready for operation on the road; including a minimum equipment consisting of a set of tires attached to the wheels; a driver's seat with padding or cushion on all chassis' rated at one ton capacity or more; front wheel fenders; running board or mounting step; tool compartment; priming coat of lead on all parts to be painted; pair of front lights and one tail lamp; license brackets; warning signal; jack and a set of tools commonly used for making adjustments and minor repairs on the road."

The manufacturer usually gives the weight of his chassis based on this definition. They also have a certain body allowance in addition to the live load which is applied to trucks of the various capacities.

The body allowance as used by some of the principal manufacturers of trucks are maximum weights now in use. Those shown below. These figures generally cover the range of maximum weights now in use. Those shown in bold face type are those in most general use.

Truck Capacity	¾ ton	1 ton	1½ T	2 ton	2½ T	3 ton	3½ T	4 ton	5 ton	5½ T	6 ton	7 ton	7½ T
Body Allowance in lbs.	600 750 850 900	720 750 900 950	1050 1100	1000 1200 1250 1300 1500	1200 1350	1500 2000	1400 1500 1600 2000	1700 2300	1500 1800 2500	1850 2000	1900	2000	2000 2100

It is hoped that truck manufacturers will more nearly standardize in all matters of the character mentioned in the near future, as it will in turn very materially assist the oil companies and tank builders in a standardization of their equipment.

A rough check may be obtained for preliminary weights as follows: The weight of the tank together with its cradle, heavy piping, faucets, bucket box, bumper and side can rails is approximately for tanks

of 400 gal. or less, 3.25 lb. per gal. of capacity; for tanks from 400 to 800 gal., 2.75 lb. per gal. of capacity, and for tanks greater than 800 gal., 2.50 lb. per gal. of capacity.

Figuring very roughly, 11 gal. added to the capacity of a tank of No. 10 gage metal will add approximately 100 lb. to the body and live load.

When buying, the entire proposition should be carefully calculated as outlined herein. The trouble has been in the past that it has been largely a guess work proposition by practically everyone concerned.

It can be readily seen that it is not practicable to attempt to put in tabulated form the various sizes of tanks best suited to any capacity truck inasmuch as the total capacity is controlled by the body allowance and accessories included in the factory weight of the particular chassis to be used and by the number of compartments, size of can box, and type and capacity of can rails. For example, the careful calculation of the capacity for oval tanks on two 2½-ton chassis of different makes, developed the following figures.

Truck No. 1

Truck not equipped with can rails for lubricating oils.

1	Compartment—with bucket box	680 gal.
1	"—without bucket box	690 gal.
2	"—with bucket box	665 gal.
2	"—without bucket box	675 gal.
3	"—with bucket box	650 gal.
3	"—without bucket box	660 gal.

Truck No. 2

Truck equipped with can rails for lubricating oils.

1	Compartment—with bucket box	580 gal.
1	"—without bucket box	590 gal.
2	"—with bucket box	565 gal.
2	"—without bucket box	575 gal.
3	"—with bucket box	550 gal.
3	"—without bucket box	560 gal.

Truck No. 2, which was in about the same class as to construction, and price could not handle within 40 gal. of the above quantities without being overloaded.

Managers should realize that there is a limit to the amount of lubricating oil that can be carried economically in connection with a truck which is considered to be for

the distribution of gasoline. The writer has seen trucks carrying so many cans of lubricating oil that the gasoline load was a comparatively small one and it would have been far cheaper to send out stake trucks with the lubricating oil and allow the gasoline truck to be equipped with a tank which would handle a capacity load.

This is not a hard problem but one which should be given careful consideration.

* This article is a continuation of a series relative to gasoline distribution, which was started in October.

The Resiliency is Built in the Wheel

Reasons Why

Sewell Cushion Wheels

LEAD

In Resilient Truck Wheel Sales

- 1st** Sewell Cushion Wheel Company were the pioneers in the Resilient Truck Wheel Industry, designing and manufacturing the first practical and successfully proven Resilient Truck Wheel.
- 2nd** Sewell Cushion Wheels have long proven their ability to serve continuously and unfalteringly over a long period of years, never requiring a repair or replacement.
- 3rd** On the basis of comparative cost figures against other types of equipment, they have established their positive value and economy in truck transportation.
- 4th** They are built with the highest grade of materials available and backed by a national sales and service organization and an organization whose manufacturing and financial stability is unquestioned.

Sewell Cushion Wheel Company, Detroit

Branches and Distributors in 50 Principal Cities

The question of the capacity of individual compartments in more than one compartment tank is one which is in a great many cases improperly decided by the oil company without being considered from an engineering standpoint. The capacity of each compartment is governed by the distribution of load between the axles, the overhang of the tank beyond the wheel-base and the weight of compartment bulk-heads. Practically all trucks are so designed that the greater capacity compartment will be in front and the smaller compartment in the rear. In two compartment tanks the ratio of the front and rear compartments is approximately 3:2 and in three compartment tanks it is 9:7:4.

The maximum number of compartments that can be used is also another question of economics. It is, of course, dependent in a large degree on the class of customers to be served by the oil company; whether they buy in small quantities or large.

As a general rule the following tabulation will apply:

Trucks of $\frac{3}{4}$ ton capacity—one compartment tanks only.
Trucks of 1 ton or over capacity—one or two compartments.
Trucks of 2 ton or over capacity—one, two or three compartments.
Trucks of 4 ton or over capacity—one, two, three or four compartments.

In order to secure additional gallonage on a truck the mistake is sometimes made of building the tank of too light a material. The gages specified in the table are as light as should be used and at the same time are heavy enough to give rigidity and strength.

Occasionally leaks will develop in the bulk-heads of compartment tanks. This becomes a very serious matter when different compartments are used for different commodities. Serious accidents are likely to be caused and to be followed by costly damage suits by kerosene being contaminated with gasoline. Heavy loss is also likely to occur through the contamination of lubricating oil by either gasoline or kerosene. The best method to determine in just which bulk-head such a leak is located is to have a drain cock in the space between the bulk-heads.

To facilitate accurate accounting, checking of stock and employees and also to assist the tank loaders, a permanent gage mark should be made in each compartment.

Manholes are almost indispensable especially in compartment tanks when a leak develops in the bulk-heads. The criticism has been in the past that they were designed so as to incorporate too much weight and in many instances they were of such small diameters that they would not permit even a small man to enter the tank. Another item for criticism in the past has been the design and size of the filter plug in the center of the manhole. They should be of such design as will allow them to be opened and closed by hand and at the same time not become loosened by vibration on the road. It is extremely poor practice to allow the use of a hammer. It not only soon ruins the thread but a spark is often made which may result in a bad fire. Plugs that are designed to be opened and closed with either a spanner or a socket wrench usually end by being ruined with

a hammer because the wrench has become lost or mislaid. The use of a hammer has also been the cause of ruining a number of vents.

Less than three years ago some truck tanks were still being constructed with two-inch filler plugs. Today a four-inch and usually a six-inch filler plug is in almost universal use while one company is experimenting with an eight-inch plug on some of its larger units.

Every tank, regardless of its size, should be equipped with surge plates. This will tend, in a measure, to stop the violent shifting of the liquid when the tank is only partially loaded. Care should be used to see that they are so designed and placed in the tank that a man can enter for the purpose of making repairs, etc.

The piping of the tank is one of the most vital questions to consider in connection with the design of this class of equipment. The principles involved are generally the same as those governing the size of filler plugs.

In the summer of 1918 experiments with two, three and four-inch piping were conducted by one of the oil companies for dump load business. A one and a half inch pipe has a discharge area of approximately 1.77 sq. in., while a three-inch pipe has a discharge area of about four times as great, although the diameter has only been doubled. It does not follow that the actual discharge in gallons per minute from a tank truck is going to be in the same proportion at all times. The rate of discharge is governed by the head or depth of the liquid which is being constantly diminished as the discharging process proceeds. It will, however, greatly decrease the actual time consumed in unloading. Larger pipe also reduces friction.

A truck carrying a 1500-gallon tank of three compartments equipped with three-inch piping results in a saving of $66\frac{2}{3}$ per cent of time over the same tank equipped with $1\frac{1}{2}$ -in. piping.

Experiments are now being conducted with still larger capacity trucks equipped with four-inch piping and it is believed that they will reduce the cost of delivery per gallon another quarter of a cent.

The size of the fill pipe should be of enough larger diameter than the piping on the truck to allow an easy entrance of the hose and also for additional venting. The sizes shown in the following table will meet all requirements in this respect:

Size of truck piping	Size of fill pipe
$1\frac{1}{2}$ in.	2 in.
2 in.	3 in.
3 in.	4 in.
4 in.	6 in.

On single compartment tanks of 600 gal. or more capacity it is well to use a flange of greater diameter than the piping so that the piping may be further enlarged at any time in the future without the expense and loss of time in putting on new flanges.

Some tank builders will protest the practice of large piping because of the additional weight and extra cost of the piping. If the entire design is properly worked out, this additional weight will not affect the gallonage which can be carried and the added cost becomes almost a negative quantity when compared with the reduction in the cost of delivery.

Large piping will be of vital necessity should an auxiliary truck transport system be organized to work economically for the purpose of delivering large quantities between centers of population at such times as rail systems or any part of them might become paralyzed from any cause which would prevent the normal use of the tank cars.

When trucks are to be used in a bucket delivery service, the piping should be reduced to two inches by the use of a swedge nipple and a two-inch tank wagon faucet used. This is the largest faucet which can be used for filling a five-gallon tank wagon bucket without spillage. This method will permit of the truck being changed from a bucket service to a dump load with hose service or vice versa in a very few minutes.

The larger piping on account of the additional weight through the vibration caused by poor roads is slightly more apt to develop leaks. To properly provide against such an accident with its resulting loss of stock and the probability of fire, and to insure accurate loading and gaging of tanks and to make possible the rapid and safe putting on and removal of faucets and to prevent the loss of stock through faucets becoming opened by road vibration, each compartment should have accurately fitted into the inlet side of the discharge flange, a quick-acting emergency valve, and should be operated by a lever at the top of the tank. These valves should always be kept closed except when a compartment is actually discharging.

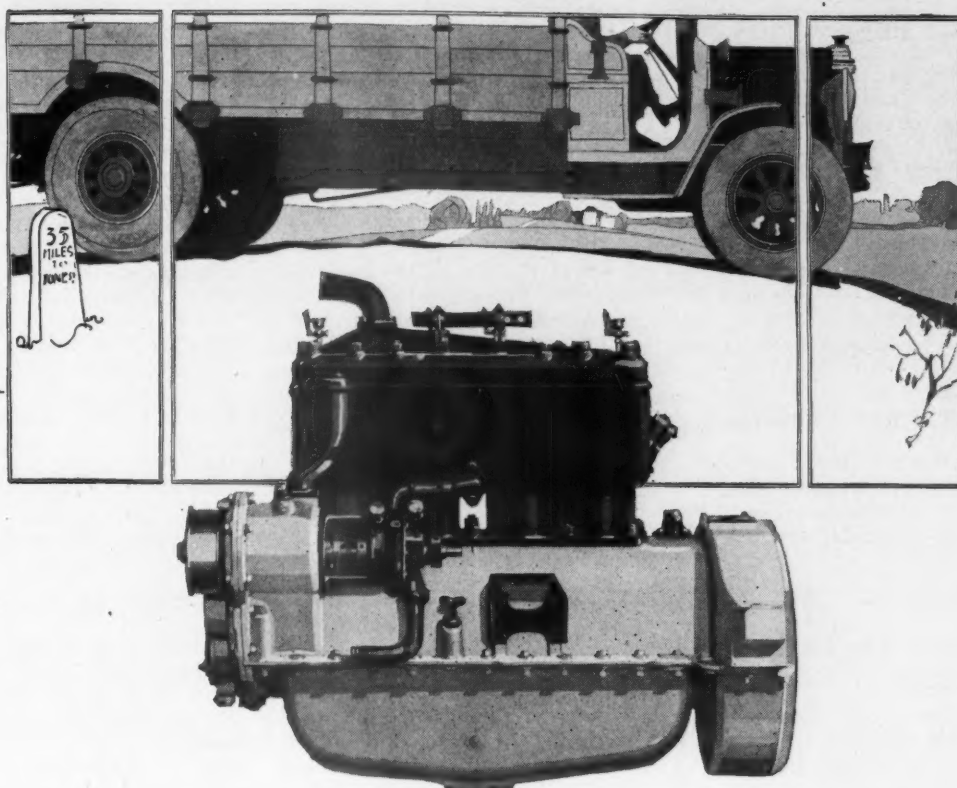
The absence of emergency valves on a tank truck of gasoline was recently the cause of a fire resulting in over \$50,000 of damages which was finally paid for by the oil company.

Another thing that should be carefully watched is the arrangement of the piping and see that all unnecessary bends and angles are eliminated. An unnecessary bend causes friction and results in a slower discharge. It is never necessary to use more than one 90° and one 45° elbow in a line.

Tanks have been built with a one and a half-inch flange, a short one and a half-inch nipple, a tee of the same size and two one and a half inch lines to the rear of the truck, each line containing a 90° ell, under the belief that the two lines could unload faster than one. As a matter of fact two lines, on account of the unnecessary ells are actually slower than a single line of the same size. The only way in which these two lines could be made to work faster would be to use a pump which would be the same as increasing the head. All pipes should be carried in hanger from the under side of the cradle as an additional preventative against leaks.

The thread on end of pipe where the faucet is to be attached, all threads on the faucet and the threads on the hose connections should be the same for all trucks in order that hose and faucets shall be readily interchangeable on all units.

The rear end of the piping and faucets should be protected by a substantial bumper. The absence of the bumper on a loaded tank truck has also been the cause of one or two disastrous fires.



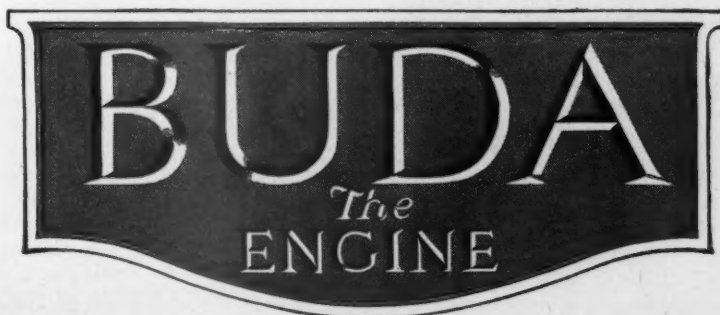
The smooth and reliable action of the Buda engine in truck and tractor duty is the product of a shop practice developed through 39 years of experience, and a competent design that assures the efficiency of every working part.

Buda pistons, for example, have a fourth piston ring placed below the piston pin—a wiper ring that prevents the passage of excess oil into the combustion chamber and guards against carbonization.

It is because it embodies every such mechanical provision for powerful, economical performance that the Buda engine is standard equipment today in the automotive products of 89 representative manufacturers.

THE BUDA COMPANY, HARVEY CHICAGO ILL.

ESTABLISHED 1881



Another item that is often overlooked is to see that the piping and faucets are so spaced and the bumper so designed that a tank wagon bucket can be hung on all faucets at the same time.

The tank cradle may be either of wood or padded metal bolsters placed directly on the chassis frame or on wooden sills attached to the frame. A type of cradle is coming into use known as the "Steel Partition Mounting" by some companies. It consists of steel bolsters resting directly on the frame. The cradle is really formed by an extension of the compartment bulk heads. It is claimed that this type of construction gives a considerable reduction of weight without any loss of strength or rigidity.

Regardless of the type of cradle used the frame of the chassis should never be weakened by drilling it in order to secure a fastening. "U" bolts or similar fastenings should be employed.

The fastening of the tank to the cradle of the former type is best accomplished by straps passing over the tank and into or through the bolsters and made adjustable by turnbuckles. On tanks of extreme length, sway braces should also be used.

The bucket box should be of such size as will accommodate all of the buckets, funnels, etc. The practice of carrying them on hooks or hanging on the faucets or on top of the bucket box is a poor one, and for this reason the round top type is specified. Experience has shown that the bucket box will give better service if welded to the rear of the tank than when fastened to the sills only. A metal box is far better than a wooden one while a metal box with a wood lining is believed to be the best. Two types of doors are in general use. The double swing door with side hinges is the type in most general use

although the writer prefers the single door hinged at the top.

The side can racks may be any one of a number of types now on the market. It is largely a matter of personal choice. The floor is usually of wood with rails of open pipe work or of pipe with sign panels of wood. The opening or gate for getting the cans in and out may be of chain or telescopic pipe. These guard rails are also constructed of wood with sign panels and may be hinged at the bottom to drop down or may be of the stake and socket type.

The question of drawings is as important in this case as in the chassis, therefore, the tank manufacturer should be required to submit detailed drawing showing all dimensions, methods of construction. All weights should also be accurately given. Everything should be carefully checked by both the oil company and the chassis manufacturer.

Williams-White Tie Rod Presses

The adaptability of the tie rod form of press to large bending, blanking, pressing, shearing, multiple punching, group punching and other similar operations is being appreciated more and more by those having such work to do in quantities large enough to warrant the purchase of a press.

Williams, White & Co., Moline, Ill., designers and builders of all sizes of forging, pressing, punching and shearing machinery, have recently completed two large tie rod presses of 500 and 800 ton capacities. These machines are being used to blank out side rails for motor

vehicle frames. It will be observed from the illustrations that these machines have been designed along the same lines, and therefore are representative of the standard large press design of the builders. Not only has the machine as a whole been carefully designed, but close attention has also been given to all details.

These presses, it is pointed out by the maker, owe their usefulness to the three following features: (a) All gears and operating parts are located overhead, so that the work can be placed into and removed from, the machine from the front, the back or either end. To this purpose the side housings are made with ample openings or windows between the tie rods. (b) The tables and rams are designed with ample die areas and openings. T-slots allow rearrangement of tools for various jobs. (c) The principle of construction is such that all vertical operating stresses and strains are taken up by heavy forged steel tension members which fasten table, housings and bridge-tree together and eliminate the possibility of broken side housings.

The die space adjustment is by large screws in the pitmans, operated through worm gearing by a separate motor mounted on the ram. The hold-downs or strippers are of steel, with a T-slot in the face of each for attachment of specially shaped

contact fingers and are operated by cams on the main crank shaft. The table on each machine has 4 T-slots and an opening 6 in. wide in the center the length of the machine. The ram face has 5 T-slots. The clutch is of the friction type, with very liberal surfaces. Automatic stop and brake are provided. All gears are steel. Twin drive is employed with cut tooth drive gears and pinions on each end of the main shaft, for equalizing the drive and eliminating torsional lag. An automatic die kick-out, connected to the ram and operated by it, is furnished to strip the work from the dies.

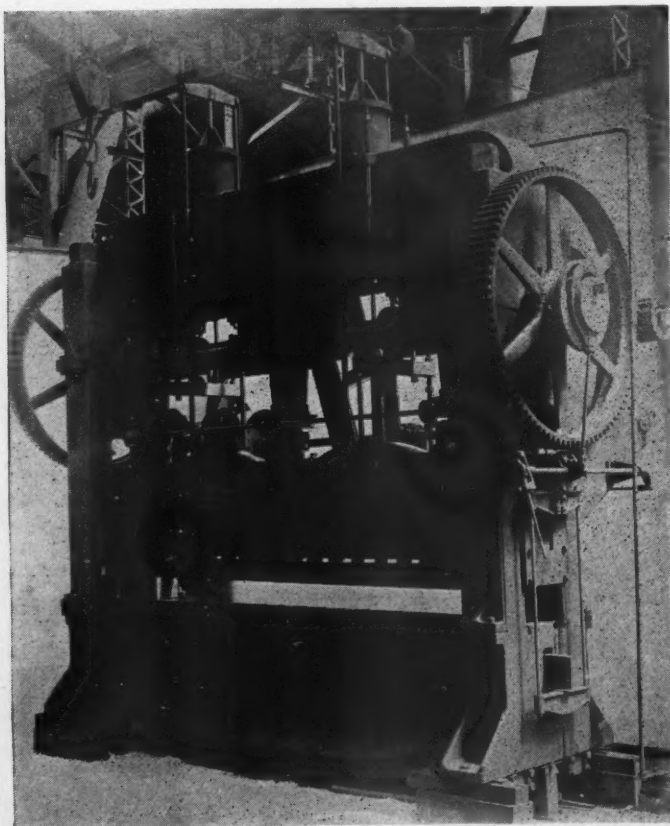
It is of interest to note that all frame castings were made in the Williams-White foundry. One of the largest castings weighs 35 tons.

The following are the principal dimensions of the two presses:

	500 tons	800 tons
Capacity	500 tons	800 tons
Distance Between Housings	16 ft.	18 ft.
Table width	30 in.	30 in.
Ram Face Width	30 in.	30 in.
Die Space, Ram Up, Adjustment Up,	23 in.	23 in.
Die Space, Ram Down, Adjustment Down	11 in.	11 in.
Stroke	7 in.	7 in.
Die Space Adjustment	5 in.	5 in.
Window Openings in Housings	24 in.	24 in.
Height Overall	252 in.	295 in.
Length Overall	262 in.	297 in.
Width Overall	126 in.	158 in.
Strokes Per Minute	12	8
Drive Motor	75 h.p.	100 h.p.

Trade Events Planned for Show Week

Some particularly interesting trade "get-togethers" are planned for the week of the New York Automobile Show and have promise of a large attendance. The second annual convention of the Automotive Service Associations is to be held at the Hotel Commodore at 10 A. M., January 10. The National Automobile Chamber of Commerce holds its annual banquet in the same building January 11 and a meeting of the Directors January 12. The twenty-first annual banquet of the Rubber Association of America, Inc., will take place at the Waldorf Astoria in the evening of Jan. 10, while its business session will occur the afternoon of the same day.



Giant Press for Blanking Outside Rails for Frames

IN the bearings sponsored by **SKF** its type of anti-friction bearings have been developed to their highest perfection. And **SKF** further provides an engineering service not only to assure to itself proper application and use of **SKF** marked products but to help the buyer to fully capitalize the mechanical value built into each device. This service is freely offered and is being continually broadened and advanced by laboratory research that is international in scope. You are assured a similar service behind every product bearing the mark—

SKF

Among these products now offered are:

Single row deep groove ball bearings

Double row self-aligning ball bearings

Thrust bearings

Steel balls

Transmission equipment

SKF Industries, Inc.
165 Broadway, New York City.

Supervising at the
request of the stockholders

The Hess-Bright Manufacturing Co.

SKF Ball Bearing Co.

Atlas Ball Co.

Hubbard Machine Co.

SKF Research Laboratories



SKF Research Laboratory established at Philadelphia to co-operate with the Gothenburg Laboratories in the study of the American Manufacturers' friction problems.

Many States Vote Highway Bond Issues

At the general election held throughout the United States November 2, five states voted highway bond issues aggregating \$192,000,000, a sixth passed a constitutional amendment enabling the state Legislature to vote bonds to the extent of \$50,000,000 and a seventh passed a constitution enabling act without specifying amounts. Another, New Jersey, voted \$29,000,000 in bonds for the construction of a vehicular tunnel under the Hudson River.

Of the highway bond issue carried, that of Missouri represented \$60,000,000; Minnesota, \$75,000,000; West Virginia, \$50,000,000; Colorado, \$5,000,000, and Idaho, \$2,000,000. Kansas passed an unspecified amount enabling act while Virginia directed its legislature to vote bonds to the extent of \$50,000,000.

The total thus added to the funds appropriated for highway construction and maintenance was \$271,000,000 which, added to bond issues passed by eight other states since 1918 gives a figure of \$543,800,000 from this source of revenue alone. Funds available from federal aid sources are placed at \$160,000,000 by officials of the Bureau of Public Roads while funds obtained from direct levies and other sources of state revenue and county issues or appropriations, will, it is estimated by the National Automobile Chamber of Commerce will swell the total that will be appropriated to more than \$1,000,000,000.

Not all of this sum is available for expenditure at once, of course, as most highway programs are extended over a period of years, but it is deemed highly significant of the interest of the public in highway transport, that such issues should be passed and generally speaking by huge majorities, in a year when other aspects of the election are generally all-absorbing in interest.

The full extent of the funds appropriated for highway work is not yet known nor is it possible yet to ascertain definitely what the projected program of work for 1921 will be. If, however, the line of curve of expenditures since the war should be extended in 1921, an approximate expenditure of \$550,000,000

would be arrived at for 1921, a figure which is believed not unreasonable by those in touch with the national road situation.

Stolen Automobile Goods Hidden in Quarry

Despoiled of salable parts, reduced to the value simply of junk, many automobiles and trucks which had outlived their usefulness, have been dumped into a watery grave at an abandoned quarry near Elgin, Ill. Driven or hauled to the water's edge, the vehicles were dumped into the deepest section of the pond in the hope of remaining undiscovered until disintegration became so great that identification would be impossible. In the meantime, insurance was collected and additions made to the long list of mysterious disappearance of machines.

Discovery that the quarry pond was being utilized for the interment of worn-out cars, was made by boys in swimming. One of the lads, making a long dive, struck the frame of a truck. The discovery was called to the attention of various insurance companies which make a business of taking risks on such property. They determined to conduct a thorough investigation. Divers from Chicago were engaged to prow around the bottom of the quarry, and there discovered ruined trucks and passenger cars. Powerful hoisting machines, operated by a windlass and cables, together with other necessary paraphernalia, were requisitioned as rapidly as the divers made a discovery, the men on shore prepared to haul the machine to shore.

One truck, belonging to G. R. Mallman, of Chicago, was among those rescued. It developed that thieves had stolen this machine, and, being unable to dispose of it, had dumped it into the pond in order to cover up their trail. Another truck was found from which the engine and other salable parts had been removed. An automobile, identified as a King Eight, carrying a 1920 license plate and which the records indicated, belonged to a Chicago man, was among those rescued. It is presumed that some of these had been stolen and dumped into the quarry to remain until the excitement over their theft had subsided.

Present Pneumatic Tire Sizes to be Continued

Resolutions favoring continuation of the present standard of pneumatic tire sizes and opposing the suggested new standard based on a 24-in. wheel diam. were passed by the joint meeting of automobile and truck makers and tire manufacturers under the auspices of the Society of Automotive Engineers at Cleveland, November 22.

The meeting was well attended by car, truck, tire and rim makers, engineers, representatives of S. A. E., Rubber Association of America and the National Automobile Chamber of Commerce.

Tire makers who favored the proposed plan urged economy in production to be expected by reducing dealers' stocks many millions of dollars and factory equipment proportionately; these savings, it was stated, were bound to be reflected in reduced prices and other advantages to car users.

Presentation by car makers, engineers and N. A. C. C. indicated desire to further standardization in every practicable way, but pointed to the trend of design toward wheel diameters smaller than 24 in., the very large production using and planned for 25-in. wheels, added expense to car maker for tire equipment in some cases, disturbance of export situation and other features that seemed to make the suggestion untenable at this time.

It was pointed out particularly that the present standard has been operating only since January 1, 1920, and that from now on the use by the public of tire sizes dropped at that time will decrease and eventually enable tire makers to reduce the number of sizes made by one-third.

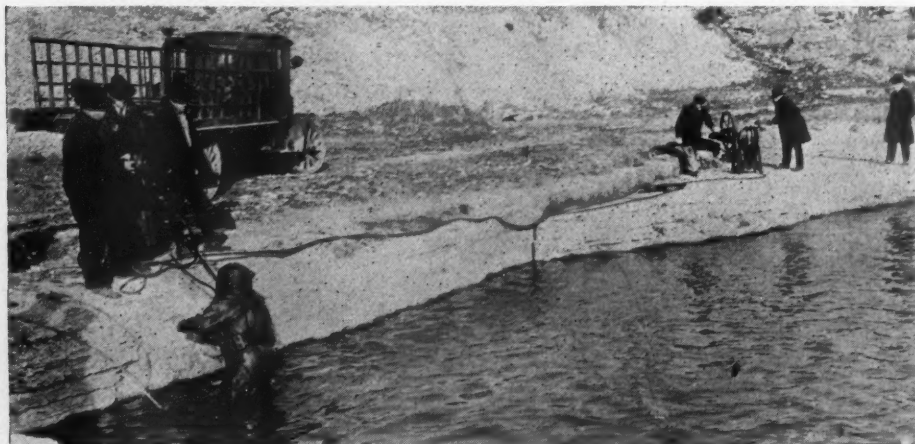
The matter was thoroughly discussed at great length, resulting in almost unanimous opinion of those present in favor of continuing the present standard and have any further suggestions considered by a joint committee representing all interests which could make a study of the subject as it may be affected by future developments.

Morse Chain Outgrows Its Ithaca Plant

Morse Chain Co., Ithaca, N. Y., manufacturer of the Morse "rocker-joint" silent chain for automobile power transmission has established a Detroit branch factory to manufacture exclusively silent chain sprockets and the Morse adjustment. The Detroit branch will be under the management of F. C. Hawley as chief engineer and C. B. Mitchell as factory manager. Sales and engineering offices are located at the Detroit plant corner of Eighth and Abbot Sts.

The Detroit plant has been added to partially relieve the Ithaca plant, which has become too small to accommodate the increasing demand for the firm's products.

The company states that it is always looking for improved and more efficient machines, tools and equipment and desires catalogs, etc., along that line.



Divers Explore Abandoned Quarry for So-Called Stolen Motor Vehicles, Bringing to Light a Novel Scheme to Collect Automotive Insurance at Elgin, Illinois

GARFORD

The Motor Truck

VS.

Frozen Credits

Insufficient transportation has congested shipments of finished goods and materials to such an extent that millions of dollars of capital have become tied up and unavailable. This has resulted in "frozen credits," and the problem of the day is to alleviate this situation.

It is conceded by our ablest business men, financiers and railroad officials that the fullest possible utilization of the motor truck is the indispensable remedy for this condition.

For self-protection, as well as for the general good, it is the duty of each and every business man to assume his share of the responsibility and—

Keep the Traffic Moving

TRUCKS

Personals

F. W. Abbott has been appointed to handle the products of the India Tire & Rubber Co., of Akron, O., in the territory of Minneapolis, Minn.

Forrest J. Alvin, general manager of the United States Motor Truck Co., Cincinnati, O., recently addressed the Muskegon (Mich.) Employers' Association on the future of the truck industry and its wonderful possibilities. The speech was delivered at a banquet held in Mr. Alvin's honor.

D. M. Boyd, formerly of Boyd-Richardson, Inc., has been elected secretary of the Traffic Motor Truck Co., St. Louis, Mo.

W. O. Browne, formerly of the Bethlehem Motors Corp., has been appointed general sales manager of the Southern Motor Manufacturing Assn., Inc., Houston, Tex.

R. H. Carroll will handle the sales end of the new Lansing, Mich., branch factory of the United Automotive Body Co., Springboro, Pa.

Charles S. Clark has resigned as sales, export and advertising manager of the H. J. Koehler Motors Corp., Bloomfield, N. J. Mr. Clark's automotive experience has covered 16 years, having been an executive in the retail, wholesale and manufacturing ends of the motor truck and automobile business. His future plans are unknown.

O. A. Foote, Jr., formerly assistant purchasing agent of the Cleveland Tractor Co., resigned as purchasing agent of Automotive Corp., Toledo, Ohio.

J. P. Hell, vice-president and founder of the Hell Co., Milwaukee, Wis., recently underwent a serious operation at the Milwaukee Hospital, and is now convalescing at his home.

Claude S. Hyman, formerly advertising manager of the Standard Motor Truck Co., Detroit, Mich., has joined the copy staff of the Charles H. Fuller Co. (Automotive Dept.), a Chicago advertising agency.

A. G. Maney has been appointed director of distribution for the Franklin Automobile Co., Syracuse, N. Y. This is a new position that has just been created.

J. A. Monahan has been appointed purchasing agent of the Chain Belt Co., Milwaukee, Wis.

James E. Ryan, treasurer and general manager of the International Purchasing & Engineering Co., 1553 Penobscot Bldg., Detroit, Mich., sailed from New York recently in the interest of his firm to call upon automobile manufacturers which the American firm represents as agents in the United States.

George W. Selberling has recently been appointed general manager of the tire factories of the United States Rubber Co.

William H. Shaefer has become a member of the sales department of the Tuthill Spring Co., 760 Polk St., Chicago, Ill. During the war he was a member of the Motor Transport Corps, Spring Replacement Division, in France.

Walter C. Shawlin, who has been acting as manufacturers' distributor, with headquarters at Minneapolis and Kansas City, for the past two years, is now sales manager for J. W. Duntley, 1004 South Michigan Ave., Chicago, Ill., manufacturer of the Duntley timer and the Duntley wire and terminal guard.

B. S. Short, branch manager of the Standard Parts Co., Boston branch, has resigned his position to join the C. G. Spring Co., Kalamazoo, Mich.

Frank E. Smith has been selected as first vice-president and a director of the Republic Motor Truck Corp., Alma, Mich., to fill the vacancy caused by the resignation of W. J. Baxter. Col. Smith is well known in the automotive industry.

M. F. Stapleton has been made sales representative of the Motor Wheel Corp., of Lansing, Mich., and will represent the firm in Illinois, Indiana and Wisconsin.

C. R. Stowell has been appointed manager of the Fresno (Cal.) branch of the Bearing Service Co., agent for Timken, Hyatt and New Departure bearings.

T. W. Tinkham, formerly general superintendent of the Willys-Overland plants at Toledo, O., is announced as assistant general superintendent of the Briscoe Motor Corp., Jackson, Mich.

A. F. Ward, until recently assistant manager of the Timken-Detroit Axle Co., has been made manager of the Omaha branch of the Bearing Service Co.

M. W. Wetzler will have charge of the credit department of the Gerlinger Electric Steel Casting Co., West Allis, Wis.

A. F. Wilkins, formerly of the purchasing department of the Republic Motor Truck Co., Alma, Mich., is the new purchasing agent of the American Tube & Stamping Co., Bridgeport, Conn.

Removals and Trade Changes

Miller Rubber Co., Philadelphia branch, has moved from its temporary quarters, 1427 Vine St., and is now located in its new quarters at 670 North Broad St., Philadelphia.

The General Motors Acceptance Corp. has moved its executive offices from the General Motors Bldg., 57th St., New York City, to 120 W. 42nd St. Offices occupy two floors.

The Jones Motor Car Co., Wilmington, N. C., Ford distributor, has moved to a new location at 225-7 Market St.

The Westinghouse Electric & Manufacturing Co. has moved the sales and service offices of the Automotive Equipment Dept., previously at New York and East Pittsburgh, respectively, to 82 Worthington St., Springfield, Mass.

The Manufacturer's Sales Co., headed by C. C. Bradford, has changed its name to the Bradford Sales Co., located at 340 Leader-News Bldg., Cleveland, O. The firm will represent two manufacturers as a district sales office of each.

The Battery Equipment and Supply has leased the entire floors of 1458 and 1460 Michigan Blvd., Chicago, Ill., and will occupy this new property shortly. J. Taylor has been appointed factory manager.

The General Motors Service & Truck Co., distributor for G. M. C. trucks, is occupying its new service station at 125 Holland Ave., Bridgeport, Conn.

The Tubular Steel Automobile Wheel Manufacturing Co. has been incorporated at Spokane, Wash., to engage in manufacturing various kinds of automobile accessories. Capitalization, \$200,000.

The Reliable Auto-Parts Co., Wilmington, Del., has incorporated at \$100,000, to manufacture and sell motor trucks, etc.

Automotive Parts & Manufacturing Co. has been chartered with an authorized capital of \$10,000 at Ayden, N. C.

The Supersteamer Manufacturing Trust, 630 Symes Bldg., Denver, Colo., has been organized to manufacture and install boilers in heavy duty trucks, farm tractors and utility and passenger vehicles of all kinds.

The R. A. Schultz Mfg. Co., 1801 Belmont Ave., Chicago, Ill., has recently been incorporated for \$60,000 for the purpose of manufacturing worm drive axles.

Trade Literature

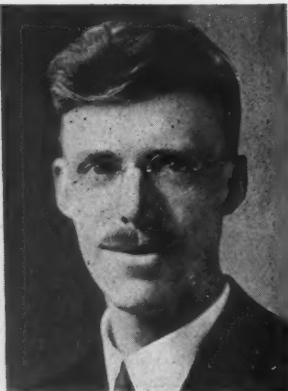
The Official Road Guide, fourth addition, of the Lincoln Highway, will be issued in Spring of 1921. The work of compiling data has already been started.

The Gary Truck, published by the advertising department of the Gary Motor Truck Co., is an interesting little monthly booklet, with some well-chosen photographs and news items.

The Westinghouse Electric & Manufacturing Co., 82 Worthington St., Springfield, Mass., has issued a 9 x 12-in. map of the United States, which shows the transcontinental highways in heavy black lines, the interstate auto routes in light red lines, and the location of its service stations. On the back of the map is a description of the starting, lighting and ignition equipment which this company manufactures.



R. E. Chamberlain
Assistant general sales manager
of the Packard Motor Car Co.,
Detroit, Mich.



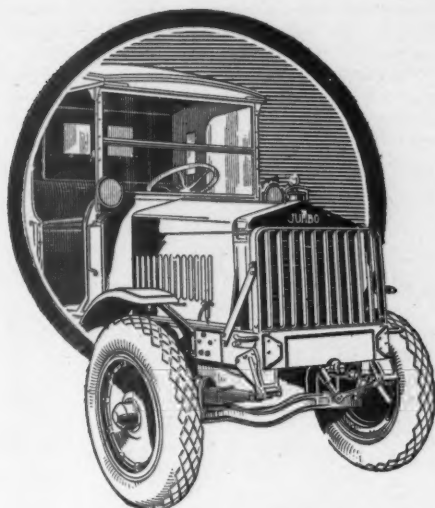
Cecil B. Warner
General sales manager and chief
engineer of the Nelson Motor
Truck Co., Saginaw, Mich.



J. A. Young
Vice-pres. and gen. mgr. Empire
Axle Co., Dunkirk, N. Y., manu-
facturer of worm-drive axles.



Harry A. Conlon
New sales manager of truck di-
vision of the Paige-Detroit Motor
Car Co., of Detroit, Mich.



Jumbo Trucks always come through

Jumbo Trucks are built to "come through" the hard usage of unusual hauling.

Many Jumbo owners with records of 20,000 to 30,000 miles—all kinds of loads over all kinds of roads—have not replaced a single part in over three years' hard service. The average replacement expense for all Jumbo Trucks is less than \$10 per year per truck.

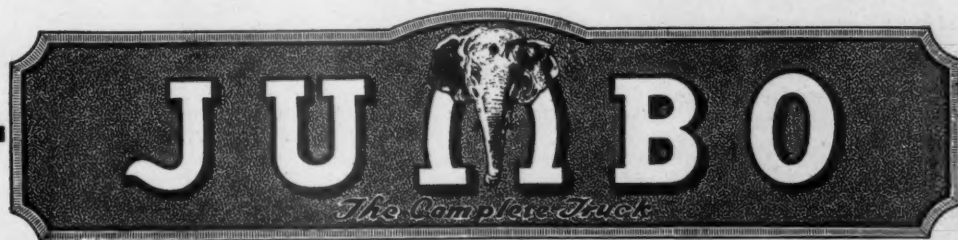
Such low upkeep cost is of special importance to dealers because it shows that Jumbo Trucks not only have long life, but also give dependable consistent service. Jumbo customers are satisfied customers—the basis for permanent profitable business.

The sale of a Jumbo Truck means more than the profit on that one job. It means your customer has a reliable transportation unit. He will tell his friends about it. It will help you get their business. It will help keep your organization among the steady, permanent business concerns of your city.

The haulage requirements of practically any prospect can be met from the Jumbo line—10 models, 6 sizes, 1½ to 4 tons.

Write today for complete sales plan and detailed information about Jumbo Trucks

NELSON MOTOR TRUCK COMPANY, Saginaw, Michigan



Factory News and Capital Increases

The Rowe Motor Mfg. Co., Lancaster, Pa., manufacturer of worm driven motor trucks, has purchased the assets of the Lancaster Body Co. and is now conducting this business as the body department of its plant. The Rowe Co. has increased its capitalization from \$500,000 to \$2,000,000.

George D. Roper Corp., Rockford, Ill., reports progress in its \$1,500,000 plant being erected on a 46-acre site at Rockford. The company expects an increase of 50 per cent. in its production of Trahern pumps in the next few months.

The United States Motor Truck Co., of Cincinnati, O., has placed its advertising account with the Akron Advertising Agency Co., who will assume responsibility for the entire merchandising plan.

Albertson & Co., Inc., manufacturer of motor repairing tools, has built a modern daylight factory at Sioux City, Ia. The plant stands on a five-acre plot.

The United Automotive Body Co., of Springboro, Pa., truck body manufacturer, is soon to establish a warehouse and assembling plant at Lansing, Mich., to handle work for the Reo Motor Car Co. and the Olds Motor Works, along with other orders.

The Bergougnan Rubber Corp., Trenton, N. J., has paid its usual quarterly dividend of 1½ per cent. on its preferred stock for the quarter ended October 31, 1920.

The Black & Decker Mfg. Co., manufacturer of portable electric drills, electric valve grinders and electric air compressors, ad-

vises that net sales as of October 31, 1920, are 163 per cent. of the total net sales of the year of 1919.

The White Co., of Cleveland, O., has installed a direct factory branch at Denver to embrace Utah, Colorado, Wyoming, Nebraska and parts of New Mexico, Montana, South Dakota and Iowa. C. E. Denzer will be sales department manager and Thomas Parramore, manager of the Service Department.

The Kardell Tractor & Truck Co., St. Louis, Mo., will increase its capital from \$1,000,000 to \$3,000,000. The increase is for the purpose of expansion, consisting of additional manufacturing equipment and largely increasing the output of tractors.

The International Motor Truck Company's net earnings of \$3,114,331 after taxes in the nine months ending September 30, were an increase of \$1,216,893, or about 70 per cent., compared with the similar part of 1919.

New Agencies

The Mason Tire & Rubber Co., Kent, O., has opened the following new western branches: 82 North Broadway, Portland, Ore.; 1748 Broadway, Denver, Colo., and 1232 South Grand Ave., Los Angeles, Cal.

The Martin-Parry Corp., York, Pa., commercial body manufacturers, established sales branches at Jackson Ave. and Honeywell St., Long Island City, and 153 Means St., Atlanta, Ga.

The Roller-Smith Co., 233 Broadway, New York, announces the appointment of L. Brandenburger, 59 West Broadway, Salt Lake City, Utah, as its representative in

Utah and parts of Idaho, Wyoming and Montana.

The Indiana Truck Service Co., 188 Grand Ave., Portland, Ore., is the name of the new Oregon agency for Indiana trucks.

The C. B. K. Electric Service Co., distributor of the C. A. H. storage battery, has opened a branch at Grand Rapids, Mich. The firm is composed of Alfred R. Collins, Phillip Boos and R. Kerkhof.

Obituary

Arthur E. Hauck, president of the Hauck Mfg. Co., died at his Flatbush home, Brooklyn, N. Y., Oct. 30, age 41. Mr. Hauck's career, beginning with his penniless start in America, until untimely death, is marked by untiring effort and devotion to his work. Much of the oil burning equipment manufactured by the Hauck Co. are the products of his invention.

A. J. Reed, general manager of the Perfection Piston Ring Co., of Ravenna, O., met death November 5, 1920, when, while driving in a pony cart with his little son, the vehicle was struck by an interurban car. Mr. Reed was formerly with the United States Piston Ring Co., of Cleveland, O., and was well known in the automotive industry.

Benjamin F. Tobin, fifty-five years old, organizer of the Continental Motors Corp., chairman of the Board of Directors of the concern and for many years the corporation's president, died at his home in Detroit, November 23, of acute indigestion. Mr. Tobin began his business career in Chicago, where he was born.

What Co-operation Has Accomplished in the Malleable Industry

Prior to the time that co-operative research work was undertaken in the interest of the malleable industry, quality of product was maintained by only a few manufacturers, whose efforts were constantly discounted by the careless methods of less scrupulous manufacturers.

During periods of business depression ruinous competition had forced many manufacturers into methods, permitting of cheapest production regardless of quality of product and engineers had, quite generally, come to the conclusion that malleable iron was entirely undependable or of low tensile strength.

In about 1915, some 20 to 25 manufacturers of malleable jointly authorized a research program along the lines of metallurgical research and other important allied subjects.

When the research work started the majority of manufacturers had no system for testing the quality of their product, aside from the twisting and bending of castings.

After the survey it was decided that tensile test bars be cast by all who were interested in bettering the product, and that they should be sent to the consulting engineers representing the manufacturer using the product, who could then ascertain the quality of iron made by each manufacturer through comparison.

An idea as to the vast improvements made in the quality of the product as

direct result of this co-operative effort through a period covering the last decade, is presented by the following records:

Records of tests made in 1911 showed the average ultimate strength to be about 39,000 lb. and the elongation under 5 per cent. A report made in 1920 showed an average ultimate strength of over 53,000 lb. and an average elongation of over 14 per cent. More than this, the report showed not only increased ultimate strength and elongation but an increase in the uniformity of a product upon which the engineer could rely.

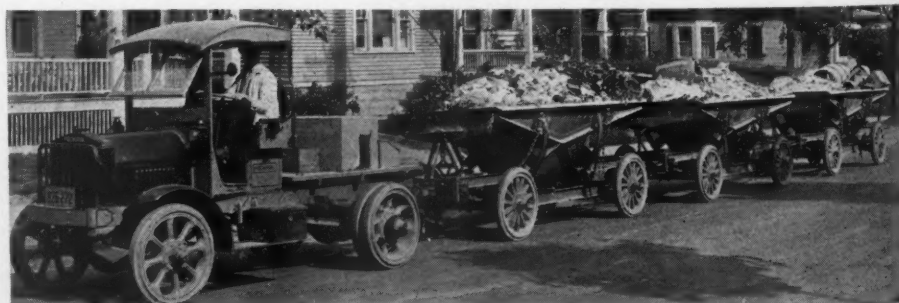
In 1919 it was decided that a certain high standard of quality in malleable iron should be known as "certified malleable," and that manufacturers who

consistently maintained this standard of quality would be provided with a certificate and authorized to advertise and sell their product as "certified malleable."

Certificates are regularly issued to members whose test bars have qualified during the preceding quarter and a list of these members is published for distribution throughout the trade.

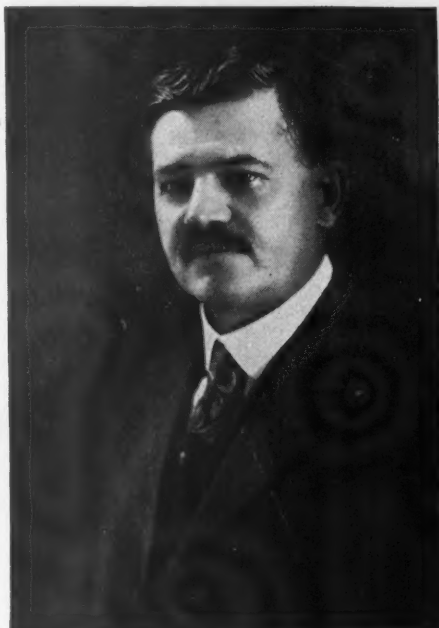
The New Slogan Adopted by the Trailer Manufacturers' Association

It is hoped by the Association that the slogan will not be confined to the organization alone, but adopted by all trailer manufacturers.



Arcadia Drop Frame Side Dump Trailers Employed by the City of Syracuse for Refuse Collection

Forty of these three-ton trailers, each having a body of 3½ yd. water level or 4-yd. when heaped, were recently acquired by this city to take care of its garbage system. In operation, the City of Syracuse uses the horse-drawn attachment for pulling the trailers around the side streets, bringing them to a central point where the tractor takes them in train to the dumping grounds. In the trains the tractors pull from 3 to 5 trailers, as the case may be.



Mr. Albert Fisher Builds The Standard Truck

ONE of the most widely known men in the commercial vehicle business is Mr. Albert Fisher.

For more than thirty-five years Mr. Albert Fisher has been recognized as one of the master craftsmen in the carriage, wagon, and motor truck business.

He is known by the leaders in the automotive and commercial vehicle business for his constant desire to improve, to build things better and more enduring, and as a man who derives greater contentment from achievement than from temporary monetary gains.

Mr. Fisher was born in Peru, Huron County, Ohio. His father was one of the old-school blacksmiths. And during his early life he helped in his father's shop after school. At the age of seventeen, he started to learn the trade of carriage and wagon building. After serving his apprenticeship there, he went to Chicago with the C. S. Kimbal & Company to learn coach-building. Then to New England, where he worked for many of the oldest coach-builders. Among them, the famous Clancy Thomas.

Mr. Fisher is one of the pioneers in the manufacture of automobile bodies. When the automobile business started he was called upon to make most of the bodies. He made

the first touring car body for Henry Ford. Numbered among his customers were Cadillac, Dodge, Packard, Chalmers, Olds, GMC and the majority of the leading motor car companies.

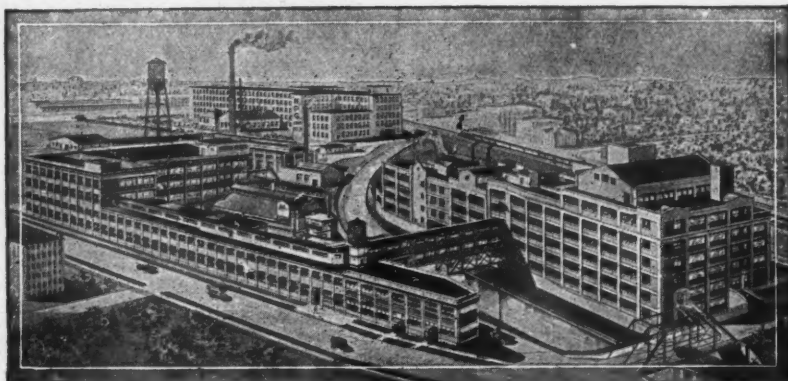
In the year 1908, Mr. Fisher incorporated the Fisher Body Company and became its first president and general manager. He subsequently sold out his interest in the Fisher Body Company to devote all his time and energy to building motor trucks.

Mr. Fisher's long experience in building carriages and wagons had convinced him that a motor truck built entirely of standard parts, properly designed and put together, was the coming vehicle. It was with this idea that he developed the Standard Motor Truck Company.

The identical practices, methods, and ideals that made Mr. Fisher one of the master craftsmen in the horse-drawn vehicle business are, and have been for ten years, built into every Standard Truck.

Consequently, Standard Trucks could not help but be singled out as trucks that are enduring, reliable, and efficient. This, perhaps, is why the thousands of Standard users, in every industry, say that the Standard is "all the name implies."

STANDARD MOTOR TRUCK CO., Detroit, Mich.



The ten-acre plant of the New Process Gear Corporation

A Perfected Gear-Making Service

Two things strike the builder of cars, trucks or tractors who visits the New Process Plant

- the amount of *detail* involved in making gears of New Process Perfection.
- the capacity to fill large orders for gears, each 100 % correct, which is represented by 10 acres of latest-type machinery.

Attention to detail and ample capacity assure you right gear-results.

Our engineers are ready to confer with you. A slight change in a few of your gear dimensions may permit you to *save money* by availing yourself of tools which we have ready.

Quality — Quantity — Quickness

New Process Gear Corporation

Syracuse

Member of the

New York



New Process Gears

DEALERS

A TRIPLE REVOLUTION *in truck merchandising*

1

One-Model Standardization

2

One-Year Guarantee

3

Radically new service-basis
between maker and dealer

THE THOMART MOTOR COMPANY

OFFICES
AKRON, OHIO

FACTORY
KENT, OHIO

Truck Transportation

This is the first of a series
of constructive messages
pointing the way to sales
and service standardization





Specifications

MOTOR

Four-cylinder, $4 \times 5\frac{1}{4}$, a development of the Class "B" Liberty Truck Motor Cylinders. Cast en bloc; detachable heads. Three-point suspension.

CRANKSHAFT

Heat-treated special alloy steel. Balanced for all speeds and loads.

LUBRICATION

Direct force feed under controlled pressure to all moving parts. External-Alemite pressure system.

IGNITION

Westinghouse.

CARBURETOR

Stromberg; latest type for low-grade gasoline.

COOLING

Radiator of honeycomb type, mounted solely on front frame cross member, free from torsion. Forced circulation by centrifugal pump.

CLUTCH

Multiple disc, 15 plate, Raybestos faced.

TRANSMISSION

Selective type; three speeds forward, one reverse.

PROPELLER SHAFT

Made up in two sections with three-fabric universal joints, center joint supported by floating ball bearing—no whipping—no wear—no lubrication—no rattling.

REAR AXLE

Semi-floating spiral bevel gear. Hotchkiss drive. Final ratio $5\frac{1}{2}$ to 1.

FRONT AXLE

Drop-forged I-beam section. Axle spindles inclined for caster action in steering.

BRAKES

Emergency and service, both internal expanding, on rear wheels. Drum 16 inches in diameter. Specially designed equalizing mechanism.

SALES STANDARDIZATION

Simplify and standardize your selling problems. Concentrate on one model. The Akron Multi-Truck satisfies 75 per cent of all haulage requirements. *Dealers*—realize the efficiency of:

One Model to Sell

One Model to Demonstrate

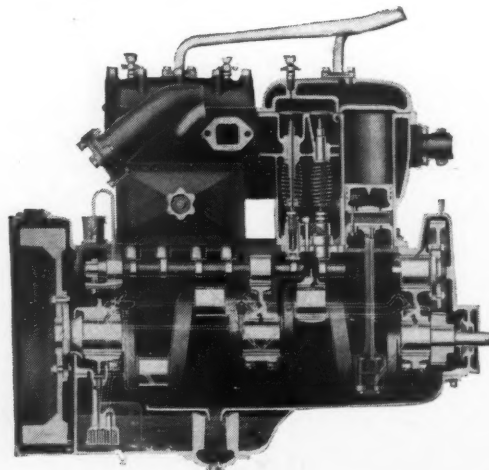
One Model to Guarantee

One Analysis of Territory

No Scattering of Sales-Energy

Merchandise quality transportation. Supply customers with real truck economy.

The Akron Multi-Truck meets the critical need for all-round utility in a single model.



The highest priced motor built in America is used in the Akron Multi-Truck. It combines an exquisite balance with the requisite weight for strength and long life. Big torque and slow-running.

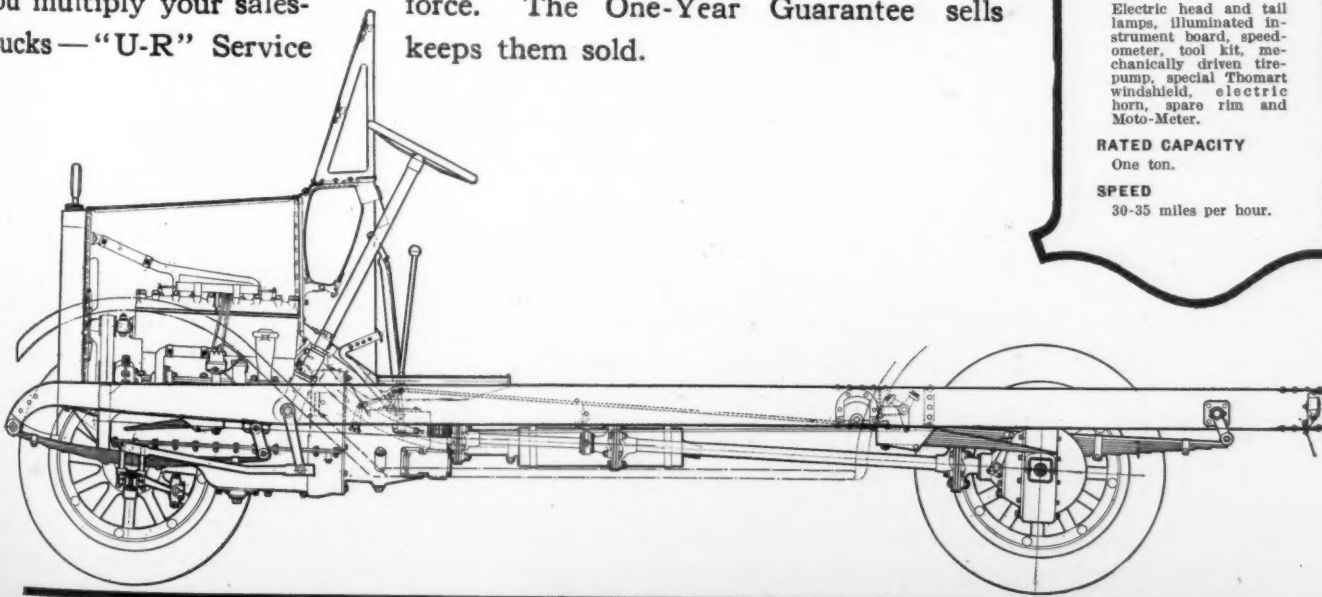
ONE YEAR



SERVICE STANDARDIZATION

Eliminate heavy stock inventories. Put *your* capital into business development. Represent the Akron One-Model Multi-Truck and you standardize service as well as sales.

Carry *one* set of replacement parts, not six or seven. Stop worrying about idle capital tied up in stock. Render Unit-Replacement service to customers (practicable only under one-model standardization) and you multiply your sales-force. The One-Year Guarantee sells trucks — "U-R" Service keeps them sold.



Specifications

FRAME

Pressed steel, 5½ in. channel, four cross members. Length 16¼ feet; width 34 inches.

SPRINGS

Thomart Progressive type front and rear; Primary Set—semi-elliptical, long, flexible and resilient for light riding and high speeds. Auxiliary Set—quarter-elliptical, automatically brought into operation proportionately with load increase.

ELECTRIC EQUIPMENT

Westinghouse two-unit starting and lighting system, integral with engine assembly.

TIRES

Pneumatic cord, 34 x 5.

WHEELBASE

133¼ inches (Tread, 56 inches).

CHASSIS EQUIPMENT

Electric head and tail lamps, illuminated instrument board, speedometer, tool kit, mechanically driven tire-pump, special Thomart windshield, electric horn, spare rim and Moto-Meter.

RATED CAPACITY

One ton.

SPEED

30-35 miles per hour.

GUARANTEE



What We Are Going to Do for You

We have not invested our thought and capital in the creation of a super-truck without the certain knowledge of market requirements. We have constructed a quality truck with a speed capacity of 30-35 miles an hour because we saw the critical need for this type of motor truck. We have built into its construction certain individual points of design that adapt it to quick hauls under all conditions. We built one model alone because the time is here for standardization in service and sales.

We have given the same intensive thought to the Dealer's problems—we have more than even a super-truck to offer you. We have a Plan for Merchandising Akron Multi-Truck Quality Transportation that, step by step, simplifies your sales and service problems. We bring our Sales organization into your territory and co-ordinate with you to make you the leader in truck sales and service in your territory.

You know as we know that Service alone keeps trucks sold. Akron Multi-Trucks *will* be sold and serviced in your territory. Are you the Dealer?



THE Thomart Motor Co.

Offices: Akron, Ohio

Factory: Kent, Ohio

POLACK TRUCK TIRES

POLACK TYRE & RUBBER ©

Announcing

**Largely Increased Production
Scheduled for 1921**

Additional new machinery is now being installed, increasing our production three times our present output, which will enable us to meet the wonderful growth in the demand for our

HIGH CROWN AND GIANT TIRES

made for hard service.

Polack Dealers have our assurance that their quantity requirements will be taken care of promptly. Depend on us for speedy deliveries.

DEALERS

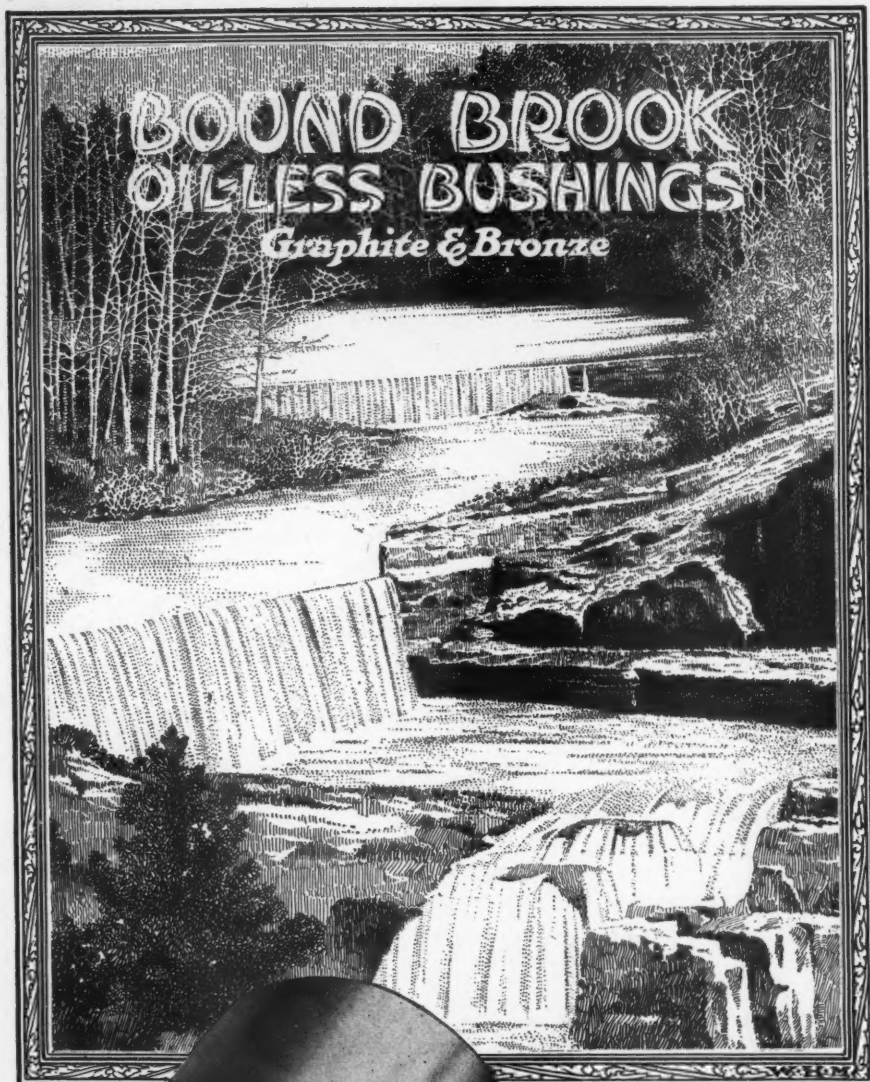
There is Still Some Territory Open for the Leading Solid Truck Tire Proposition on the Market

POLACK TYRE & RUBBER ©

1876 Broadway, New York

Subsidiary of
THE BUCKEYE RUBBER PRODUCTS CO.
Willoughby, Ohio

**WORLD'S STANDARD
SINCE 1899**



Longer Chassis Life

"Bound Brook" graphite-and-bronze Oil-less Bushings perform a valuable service in prolonging the life and usefulness of car and truck chassis.

It is not possible, even through constant lack of attention, to deprive a "Bound Brook" Bushing of its necessary supply of lubricant. This insures against sudden wear and breakdown following upon the heels of neglect.

We also manufacture "Nigrum" impregnated hardwood Oil-less Bushings.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

BOUND BROOK OIL-LESS BEARING COMPANY

Specialists in the manufacture of Oil-less Bushings for more than a third of a century

Bound Brook

New Jersey

Detroit Office: 1723 Ford Bldg.



SPEEDING UP COAL DELIVERIES

Big Market for Trucks Equipped With Hydro Hoists

The Hydro Hoist is everywhere finding favor with coal dealers because it enables them to handle a larger number of orders for less cost in less time and with less work. "It pleases us to tell you," writes Mr. Chas. L. Crush, President, Atlas Coal Company, Louisville, Ky., "that the Hydro Hoist on all the trucks are working perfectly, and we can now increase our deliveries more than 40% by having the Hydro Hoist; and we have discarded all the hand hoists."

Every coal dealer is a potential truck buyer. Show him the value of your truck, Hydro equipped, which dumps its load in fifteen

seconds; utilizes all the loading space back of the cab (note upper photograph); is simple to operate and care for and absolutely dependable. The economy and efficiency of power unloading over every other means of unloading is at once apparent.

Heil Bodies are properly designed and strongly built. Swinging partitions can be installed to divide the body into compartments for hauling several orders at one time.

Circular 113 gives various types of bodies adapted for coal dealers, contractors, general truck companies and others. Let us send it to you.

THE HEIL CO.

1143 MONTANA AVENUE

MILWAUKEE, WISCONSIN





Fig. 102. 5 Gallon Pump



Reasons Why You Should Buy Your Gasoline From Bowser Piston-Type Pumps

The prestige of Bowser Piston-Type Measuring Pumps for serving gasoline is built on their thirty-five years' consistent record of **ACCURACY—RELIABILITY—SAFETY—SPEED—AND PURIFICATION** of GASOLINE.

ACCURACY—determined by positive mechanical means—and indicated on a scale at eye level.

RELIABILITY—hand power always available—easy operation prevents fatigue.

SAFETY—no danger of breakage and spilling gasoline to endanger lives and property.

SPEED—the fastest service pump on the market—more than 20 gallons per minute.

PURIFICATION—Bowser centrifugal filter positively separates all impurities—all the pep, but no water, reaches the car.

S. F. BOWSER & COMPANY, Inc.
Fort Wayne, Indiana

S. F. Bowser & Co. of Texas
Dallas

S. F. Bowser Co., Ltd.
Toronto



BESSEMER

What to Look for in a Truck Dealership

There is one paramount requisite in the selection of a truck dealership proposition. It is the one thing upon which satisfied customers, repeat orders and increased business hinges. It is "the making" of a successful dealership. And that one thing is *persistent, never-ceasing co-operation from the truck manufacturer.*

Ever since the inception of our business, we have maintained a definite, solidly-backed policy of service to dealers. There is a standing order in our plant that service jobs take precedence over regular production. There is no quibbling over adjustments and replacements—the dealer and truck owner are satisfied.

Service From the Truck

Bessemer Trucks have the stamina and ability to stand up unflinchingly under hard daily service with a minimum of repairs and depreciation. When another truck is needed the Bessemer owner just naturally turns to the Bessemer dealer to supply his needs. That is why a survey of nationally-known concerns using fleets of Bessemer Trucks proves conclusively that Bessemer Trucks are not surpassed in quality by any other make, regardless of price. Bessemer Trucks are made in 1, 1½, 2½ and 4 tons capacity.

Look for this "service from the manufacturer" when you select a truck dealership. A post card will bring detailed information about the Bessemer dealership proposition.

BESSEMER TRUCK CO.

GROVE CITY, PA.

MOTOR TRUCKS



FRAMES

and Steel Stampings



AXLE HOUSINGS
AXLE HOUSING COVERS
BRAKE DRUMS
STEP HANGERS
TORQUE ARMS
RUNNING BOARDS
ENGINE PANS

Cleveland
Fifth City

**PARISH & BINGHAM
CORPORATION**

Cleveland,

Ohio.

DAY-ELDER

WORM-DRIVE MOTOR TRUCKS



Revised Prices:

MODEL A
1-1½ tons
Chassis Capacity
Including Weight
of Body
3500 Pounds
\$2100

MODEL B
1½-2 tons
Chassis Capacity
Including Weight
of Body
4500 Pounds
\$2300

MODEL D
2-2½ tons
Chassis Capacity
Including Weight
of Body
6000 Pounds
\$2750

MODEL C
2½-3 tons
Chassis Capacity
Including Weight
of Body
7000 Pounds
\$2950

MODEL F
3½-4 tons
Chassis Capacity
Including Weight
of Body
9000 Pounds
\$3750

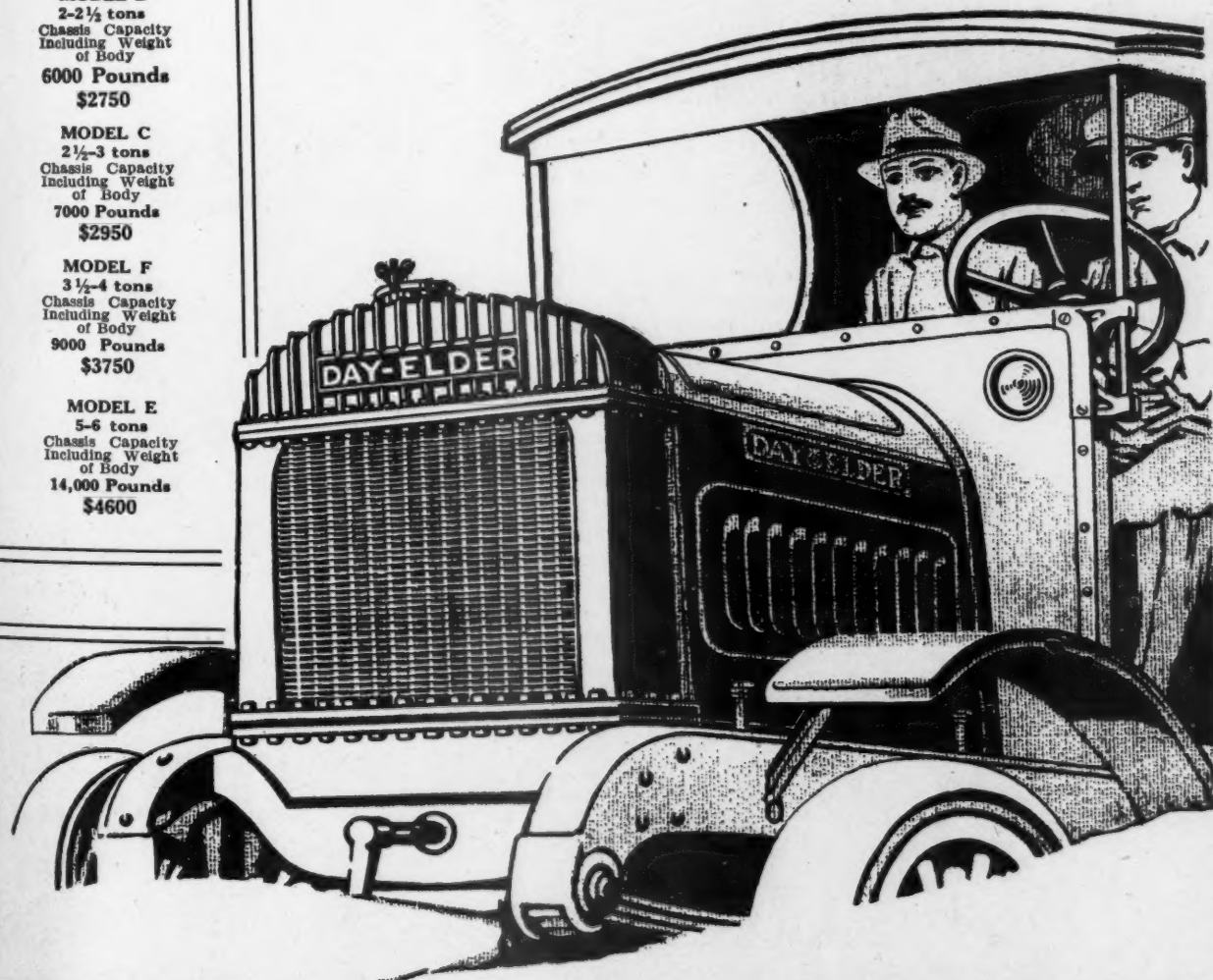
MODEL E
5-6 tons
Chassis Capacity
Including Weight
of Body
14,000 Pounds
\$4600

More Emphatically Than Ever the Dominant Value in Worm-Drive Motor Trucks in America Today

As broad and sweeping as such a statement may seem, it is none the less *a fact*—based not upon our own sentiments in the matter, but upon an analysis of the specifications of all other worm-drive trucks built.

These facts furnish the strongest reasons we know of why *you* can sell DAY-ELDER trucks to greater profit than any other.

There is at present, territory of great possibilities available for a few live wire distributors. Write or wire at once for particulars



DAY-ELDER MOTORS CORPORATION, NEWARK, N. J., U. S. A.

"The Spring is the Thing"



MATHER SPRINGS

Scientifically Heat-Treated

Unequalled for
**Lightness, Flexibility
and Endurance**

Genuine made only by

THE MATHER SPRING COMPANY

Toledo, Ohio



Ready for a Day's Work—Every Day

Part of a Fleet of 32 Mack Trucks
Owned by the U. S. Bureau of Mines

All SPLITDORF Equipped

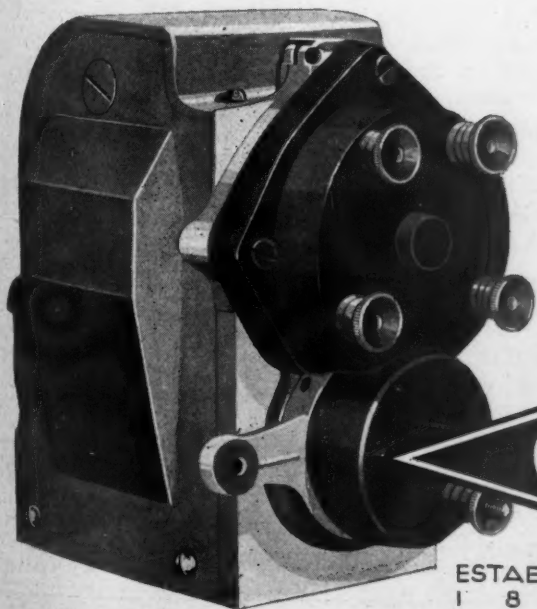
It is a noticeable thing that Splitdorf equipped trucks are faithful to the job. See them lined up for the day's work—no gaps, no deserters, no laggards, no idlers eating up your profits or disappointing customers. You learn to bank on Splitdorf Ignition just as you do on your most faithful drivers. It's a real comfort to know that you have Splitdorf dependability backed by Splitdorf Service—14 direct factory branches and more than 300 service stations.

SPLITDORF ELECTRICAL CO.

NEWARK, N. J.

*World's Largest Makers
of Ignition Equipment*

Magnetos—Spark Plugs—Peened Piston Rings, Etc., Etc.





BABCOCK UNIVERSAL VESTIBULE CAB

**An
Unlimited
Sales
Opportunity**

Truck Manufacturers

This cab as standard equipment will furnish your sales force the new selling arguments which the present competitive market demands. Your inquiries will have our prompt attention.

DEALERS: Cast your eyes over the advanced constructional design of this new All-Season Cab which can be fitted to almost any standard chassis. A Cab that will enable you to clinch truck sales: to make additional worth-while profits by replacing open equipment on trucks already in service.

Adjustable Seat

Note the adjustable seat: Made to raise—lower—slide forward—backward. Has upholstered spring cushion—special spring back—*not the usual solid seat back.*

Windshield Flattens Against Roof

Fitted in steel slides the one-piece ventilating windshield can be opened to any angle—or flattened against the roof. Breakage of glass is eliminated by hanging windshield on universal joints.

Flexible Front

The 14 gauge steel panel set in the angle steel front pillars is flexible, to absorb the twist and weave of the chassis frame.

The rear panel, with two large windows, which slides into the roof—the steel doors and lower quarters, which cannot warp—the upper sash, which folds back or can be easily removed with the quarter lights in summer. These are just a few of the many reasons why you must act quickly—before the other fellow does.

DISTRIBUTORS

New York, A. J. Diefenderfer Corporation
Chicago, Carl J. Holdrege & Company
Minneapolis, Northern Sales Company

Boston, Babcock Sales Company
Cleveland, The Babcock-Ohio Company
Philadelphia, Diamond Body Company
Pittsburgh, Pittsburgh Commercial Body Company

H. H. BABCOCK COMPANY
WATERTOWN, FOUNDED 1845 NEW YORK.

SPRING PERCH

TRUCK SPRINGS

Notice to the Trade

During the current year we have moved into, and have in full operation, our new, large and thoroughly modernized factory at Stratford, Conn. (Suburb of Bridgeport.)

We manufacture exclusively high-grade leaf springs from thoroughly tested approved alloy steels for both commercial and passenger cars.

We employ the most modern methods and in the hardening and tempering processes, use specially constructed rotary furnaces under thermostatic pyrometer control, insuring, thereby, the finest metallurgic condition possible, with absolute uniformity in temper and hardness.

Believing that the best spring is the cheapest, we invite correspondence and will be glad to submit quotations on receipt of specifications and to assist in the proper design of springs for new models about to be produced.

GET THE BEST

Spring Perch Company

Makers of Springs Since 1843

Stratford, Conn.



A REVIEW OF THE New York Truck Show

will be the leading feature of
the JANUARY ISSUE of

THE COMMERCIAL CAR JOURNAL

THIS issue will be of intense interest to the dealers of the country because they want to be posted on the latest developments of the automotive industry.

Those who are fortunate enough to be at the Show will use it to refresh their memories. The far greater number who will be unable to be there will rely on the *Commercial Car Journal* to bring the Show to them.

Thus, this issue will be of great importance to manufacturers who wish to place the merits of their products before the progressive men in the trade.

Many dealers are looking for new connections, or seeking additional lines which will be profitable to handle. This is the ideal time to secure their attention with a strong, forceful appeal, because they are now interested in buying.

Take generous space to tell your story. Impress the trade with the importance and value of your product and your standing as a manufacturer. Drive home the advantages of selling what you make.

Final forms close January 8th.

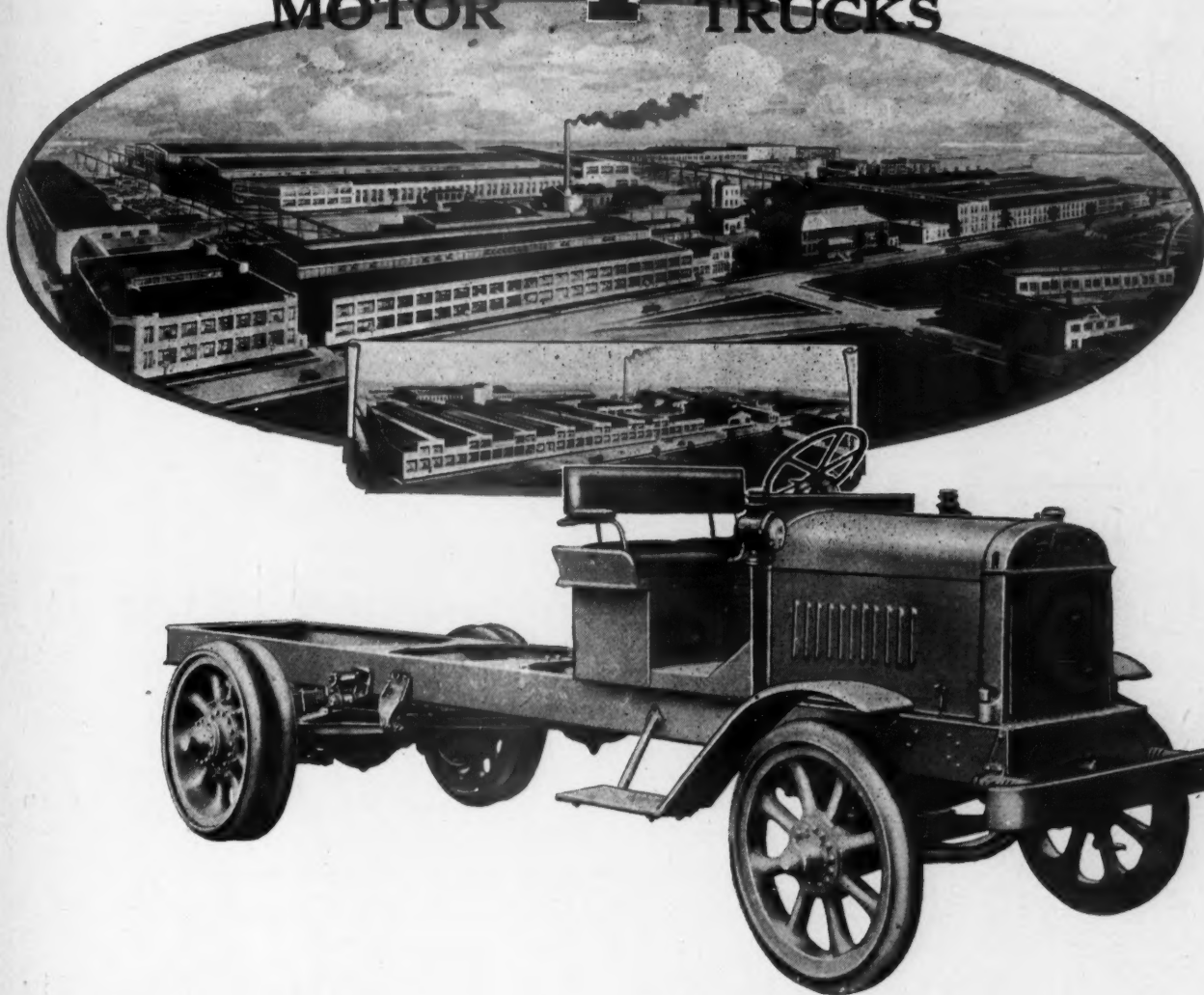
Reserve your space now.

Market and 49th Sts. **THE
COMMERCIAL
CAR JOURNAL**

Philadelphia, Pa.

TWIN CITY

MOTOR TRUCKS



37 Acres of Factory
A \$7,000,000 Institution
A Widespread Organization

These three factors behind
 Twin City 2-ton and 3½-ton
 trucks guarantee the stability
 of the business you build up.

*We invite correspondence
 from responsible distributors*

BRANCHES:

Lincoln, Neb.	Great Falls, Mont.
Des Moines, Iowa	Wichita, Kansas
Denver, Col.	Fargo, N. D.
Peoria, Ill.	Kansas City, Mo.
Indianapolis, Ind.	Spokane, Wash.
St. Louis, Mo.	Salt Lake City, Utah

Canada:

Minneapolis Steel & Machinery Co. of
 Canada, Ltd.—Winnipeg, Man.; Re-
 gina, Sask.; Calgary, Alta.

Twin City Company

Selling Products of
**Minneapolis Steel & Machinery
 Company**
 Minneapolis, U. S. A.

Distributors:

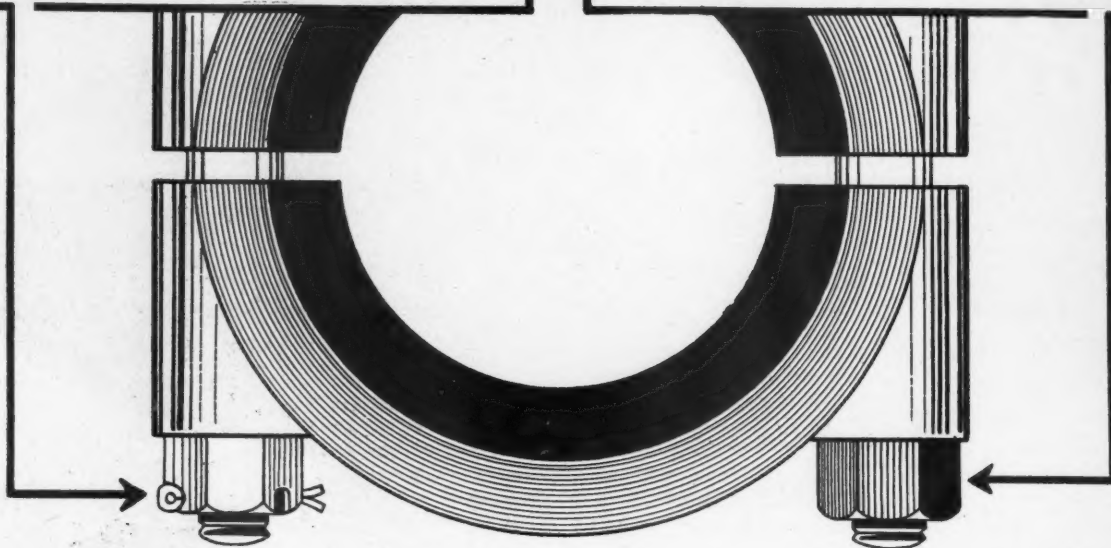
Frank O. Renstrom Co.—San Francisco
 and Los Angeles, Calif.
 Baskerville & Dahl Co.—Watertown,
 South Dakota
 Southern Machinery Co.—Atlanta, Ga.
 R. B. George Machinery Co.—Dallas,
 Houston, Amarillo, San Antonio, Texas
 and Crowley, La.

Export Office:

Minneapolis Steel & Machinery Co.—
 154 Nassau St., New York City

This Slotted Nut Must be Secured With a Cotter Pin to Prevent Its Being Bumped Off by Vibration.

This SELFLOCK Nut Eliminates the Cotter Pin. Its Offset Threads Hold the SELFLOCK Tight on the Bolt Despite the Most Terrific Vibration.



SELFLOCK NUTS Eliminate Cotter Pins

Selflock Nuts not only do away with cotter pins on connecting rods—they banish spring washers, extra nuts and all other locking devices from your entire truck assembly.

Selflock Nuts enable you to make drastic cuts in your production costs by saving—

- 1st. The cost of extra nuts or locking devices—
- 2nd. The cost of added lengths of bolts necessary for them—
- 3rd. The cost of labor to put them on.

Vibration cannot shake the hold of the SELFLOCK, because of its unique self-locking thread construction.

The self-locking threads weave their way into the bolt threads; are engaged *frictionally* so they can't come off; *lock anywhere on a bolt*.

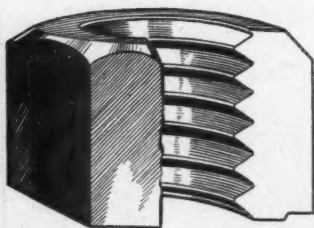
Severe vibration tests have repeatedly proved that the SELFLOCK stays locked indefinitely—whereas the ordinary nut is shaken off its bolt in less than two minutes.

Think of the large production economies you can effect when you prove that this powerful self-locking nut is all we claim for it.

How?

By Sending for Samples of SELFLOCKS and Testing Them Yourself

Holds Anywhere
on a Bolt



Selflock Nut & Bolt Co., East Syracuse, N. Y.

SELFLOCK NUTS

QUALITY SNAP RINGS

*Grinding rings
to proper widths-
working limits .0005"*

*More Than
a Million a Month*



THE *Piston* RING COMPANY
MUSKEGON, MICH.

PERFECTION

S P R I N G S



Finely Tempered *as a* Damask Blade

Not even the time-honored blades of old Damascus were more carefully tempered and fashioned than the sturdy leaves of Perfection Springs.

Designed to the finest limits of engineering precision, these springs are accurately suspended to meet the in-

dividual road and load requirement of each vehicle they serve.

For this reason, many of America's foremost manufacturers of passenger cars, trucks, trailers and tractors have adopted Perfection Springs as standard factory equipment.

THE PERFECTION SPRING COMPANY, CLEVELAND, OHIO

THE SPRING DIVISION OF THE STANDARD PARTS COMPANY

OTHER DIVISIONS ARE: THE EATON AXLE COMPANY, THE BOCK BEARING COMPANY, THE STANDARD WELDING COMPANY

THESE MANUFACTURERS EQUIP ALL OR PART OF THEIR PRODUCTS WITH PERFECTION SPRINGS

Abbott-Downing Truck & Body Co.	Columbia Motor Truck & Trailer Co.	Hal Fur Motor Truck Co.	Mercer Motors Co.	Regal Motor Car Co.
Adams-Barre Company	Commodore Motor Corp'n	Halladay Motor Corp'n	Meteor Motor Car Co.	Reynolds Motor Truck Co.
American Steel & Wire Co.	Cook Motors Corp'n	Hamlin-Holmes Motor Company	Metz Company	Robertson Cole Company
American Tractor Corp'n	Crock Motor Car Company	Harrisburg Mfg. & Boiler Co.	Miami Trailer Co.	Sayers & Scovill Company
Anderson Motor Co.	Crow-Elkhart Motor Corp'n	Harvard Motor Car Co.	Miles Mfg. Company	Seagrave Company
Apperson Bros. Auto Co.	Curtis Motor Car Company	Highway Trailer Co.	A. J. Miller & Co.	Selden Truck Corp'n
Arcadia Trailer Corp'n	Daniels Motor Car Co.	Hi-Speed Trailer-car Co.	Moller Motor Co.	Severn Motor Co.
Australian Motors Co., Ltd.	Dart Truck & Tractor Co.	Holmes Automobile Co.	Monitor Motor Car Co.	E. M. Sheehan
Auto Kamp Equipment Co.	Defiance Motor Truck Co.	Hudson Motor Car Co.	Nelson Motor Truck Co.	Signal Motor Truck Co.
Bacon Motors Company	Dependable Truck & Tractor Co.	Huffman Bros.	New England Truck Co.	Skelton Motors Corp'n
Barley Motor Car Company	Dort Motor Car Co.	International Purchasing & Eng. Company	Noma Motors Corp'n	Southern Motor Mfg. Ass'n
Bartholomew Co.	Dunham Company	Jackson Motor Corp'n	Northway Motors Corp'n	Standard Motor Truck Co.
F. H. Berger	Elkhart Carriage & M. Co.	Jordan Motor Car Company	Norwalk Motor Car Company	Stanwood Motor Car Co.
Bessemer Motor Truck Co.	Elwell Parker Elec. Co.	Kelly-Springfield Motor Truck Co.	Ohio Motor Vehicle Co.	F. B. Stearns Co.
C. L. Best Traction Co.	Erie Motor Truck Mfg. Co.	Kentucky Wagon Mfg. Co.	Olds Motor Works	Templar Motors Corp'n
J. T. Boone	Essex Motors Company	Kenworthy Motors Corp'n	Owen Magnetic Motor Car Corp'n	Towmotor Co.
Briscoe & Stahl Motor Corporation	Fergus Motors, Inc.	Kline Cars Company	Paige-Detroit Motor Car Co.	Trailmobile Company
Brown City Mfg. Company	Ford Motor Company	Kurtz Motor Car Co.	Pan Motors Company	Troy Wagon Works Co.
Buffalo Truck & Tractor Co.	Fremont Motor Car Co.	LaFayette Motors Co.	Paragon Motor Car Company	Tulsa Auto Manufacturing Co.
H. G. Burford & Co., Ltd.	Fruehauf Trailer Co.	Lansing Company	Parentl Motors Corp'n	Union Trailer Works
Cadillac Motor Car Co.	Fulton Motor Truck Co.	Lewis-Hall Motors Corp'n	H. W. Peabody Co.	U. S. Tractor & Machinery Co.
Carroll Motor Car Co.	Garford Motor Truck Co.	Lexington Motor Co.	Piedmont Motor Car Co.	Walker Johnson Truck Co.
Chandler Motor Car Co.	Gove Motor Company	Maibohm Motor Co.	Premier Motor Corp'n	Walter Motor Truck Co.
Chevrolet Motors Co.	Gramm-Bernstein Motor Truck Co.	Marsh Motors Company	Rail Welding & Bonding Co.	White Motor Company
Cleveland Tractor Company	Grant Motor Car Corp'n	Maxwell Motor Company, Inc.	Rainier Motor Corp'n	J. C. Wilson Company
Cleveland Trailer Mfg. Co.		McFarlan Motor Co.	Reed & Glaser	Winton Co.
Clydesdale Motor Truck Co.				



The
All-Weather
Carriers

Available
Always
Since 1910

Perfect Balance
Available Trucks
All over the World

Dealers Everywhere:
Write for Our Proposition

Available Truck Company
North & Kilpatrick Aves..
Chicago, U.S.A.

Available Truck Company
Safety, Research and
Transport Bureau

Columbian

Lightning Hoist

FOR MOTOR TRUCKS

The Columbian is the most rapid operating hand hoist on the market. It is the most compact in construction, occupying but 9" of chassis frame space and undoubtedly the easiest of operation as evidenced by the following engineer's report from Graham Bros., Evansville; Indiana, who have adopted the Columbian Hoists and Columbian Electric Welded Steel Bodies.

"A capacity load of gravel was dumped in 1 minute, 45 seconds, followed by a capacity load of sand dumped in 2 minutes. It is safe to place a maximum of 2½ minutes for dumping any ordinary load with this equipment."

Our national advertising keeps Columbian equipment constantly before the buying public and creates a confidence and preference that makes selling easy.

Dealers wishing to handle the best selling and best repeating line of hand hoists and steel dump bodies, should immediately communicate with us. Write for illustrated folder No. 69.



Showing a Columbian Dumping Unit Mounted on a F. W. D. Truck in State Highway Service

COLUMBIAN STEEL TANK CO.

"Tanks for the World"

1519-1625 W. 12th St.
Kansas City, Mo.

PATENTED

ARCADIA TRAILER FEATURES

Speed Up Sales for You

You, as an experienced truck dealer, know that to be *permanently* successful you must take on trailers.

The problem before you is: "Which is the best trailer for me to handle—both as regards quality and profits?"

The most casual examination of the constructional features of the Arcadia will bring conviction that here is the Trailer Line you seek.

Drop-Forged, Heat-Treated Axles

Note that the axles are drop-forged and heat-treated in accordance with the best motor truck construction practice.

The semi-elliptic springs are custom-made from Arcadia drawings. The drawbar has a coiled spring. This compresses on both push and pull, which allows

the towing truck to get an easy start. Large adjustable taper roller bearings easily carry the load; wearing parts bronze bushed. These are just a few of Arcadia mechanical superiorities.

Fast Profits

On the score of profits the Arcadia Dealer has every reason to congratulate himself.

He can furnish the right type for every line of business. "A trailer for every trade." 4 wheel trailers, 1 to 5 tons; semi-trailers, 2 to 6 tons; log and pole trailers, 2 to 6 tons; with pneumatic or solid tires. He can also furnish an Arcadia Body, designed and built to meet requirements.

When you talk Arcadia Trailers to a customer you will naturally land the order; because you will be in a position to fill his exact requirements—every time.

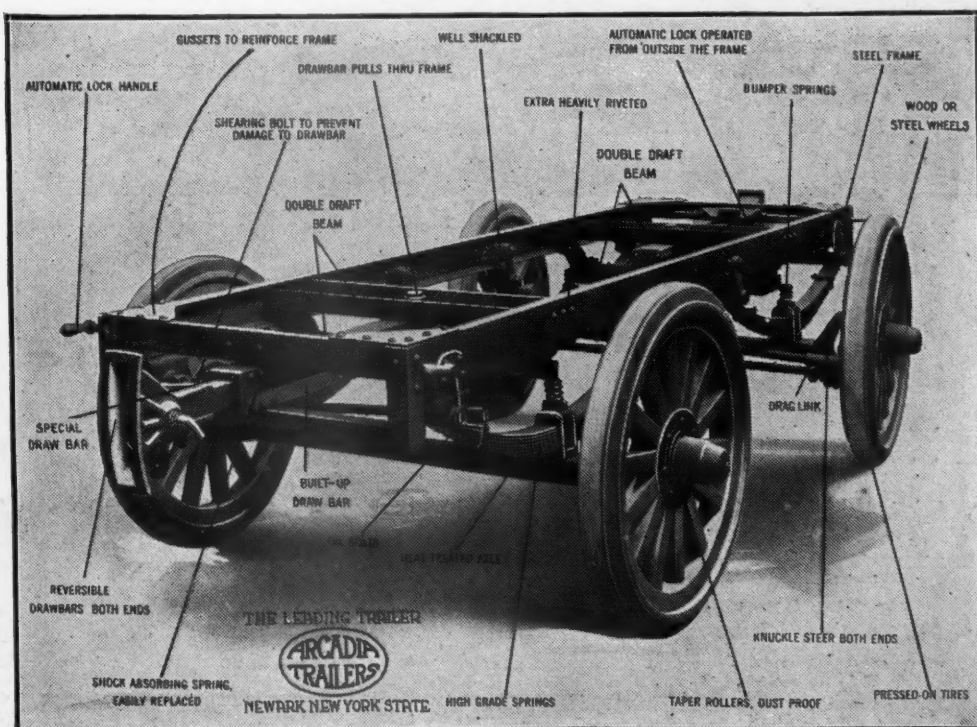
If the Arcadia Agency for your territory has not yet been assigned we shall be glad to consider your application



Arcadia Trailer Corporation

Motor Truck Bodies and Trailers

19 Murray St., Newark, New York State





This is a piece of Asbestos Rock as it comes from the mine. Note the long silken fibres. That is what distinguishes the Asbestos that gets into Non-Burn Brake Lining.

THE DICTIONARY, in defining "tough," might just as well have said "Johns-Manville Non-Burn Asbestos Brake Lining." It is woven rock!—asbestos rock blasted from the mine and woven with strong brass or copper wire into the toughest fabric in the world.

The quality of Non-Burn Brake Lining begins at the largest asbestos mines in the world, owned and operated by Johns-Manville. This insures a steady supply of the most suitable fibres, without the necessity of depending on the open asbestos market.

Selecting the best Asbestos

After the Asbestos rock is blasted from the mine it is sent away to the Johns-Manville mills to be separated and graded.

Yet from these tons of rock only a small percentage is selected in the grading process as being good enough for Non-Burn Brake Lining.

Spinning this rock on looms

These selected fibres are then shipped to the Johns-Manville factory to be spun and woven into brake lining.

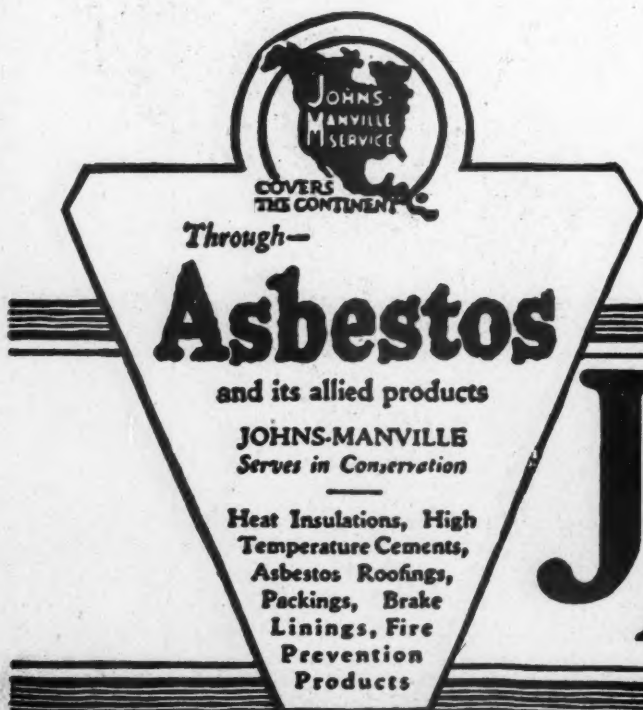
In the factory specially designed machines spin the fibres of asbestos rock into a strong, pliant yarn.

Sand and oil are great enemies to brake lining. Johns-Manville Non-Burn Brake Lining however, is protected from such things by a thorough and special impregnation.



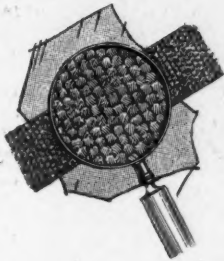
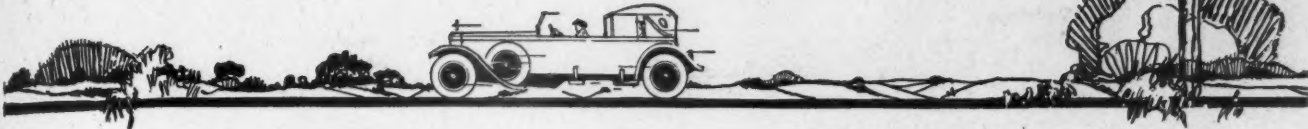
Weaving the rock

This rock yarn is now woven with brass or copper wire into a fabric so strong and closely woven that it already seems suitable for brake lining. But before this fabric is ready for use it is impregnated with chemicals that increase its naturally high resistance to the action of oil, grease, water and gasoline. This process also materially increases and preserves its frictional qualities.



JOHNS AUTOMOTIVE

stuff in the world!



See how heavy and dense the weave is—wear resistance and gripping power are built right into it.

How it is sold

Non-Burn is distributed by a group of hand-picked firms—there are none better in the automotive field. And you will find the one nearest you ready and very willing to serve you and co-operate with you.

Non-Burn Brake Lining is the only lining, mined, spun, woven and marketed by the same firm from start to finish. Johns-Manville, and Johns-Manville alone stands behind every inch of it.

Years of experience in back of Non-Burn Brake Lining

There is more real experience in back of Non-Burn Brake Lining than any other. Long before the invention of the automobile, Johns-Manville were lining brakes for huge industrial machinery. On these machines brake slippage or failure meant disaster, loss of property or even life.

Our experience of these many years shows itself in the dependability of Non-Burn Brake Lining.

Selling Non-Burn

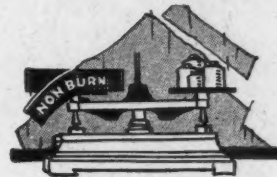
Non-Burn Asbestos Brake Lining is most readily

It is literally true that tons of Asbestos rock are sorted to obtain a few pounds of the special long fibre asbestos suitable for Johns-Manville Non-Burn Asbestos Brake Lining.

Any brake will heat up under sustained heavy pressure. But if the proper amount of asbestos is in it and the right kind, the oil and grease should smoke off leaving the lining uncharred and as safe as ever.

saleable because of the willing consumer acceptance Johns-Manville national advertising has created for it.

If you weigh a piece of Johns-Manville Non-Burn you will find that it is extremely heavy. Reason?—close, heavy weave—best asbestos rock—and thorough impregnation.



Your profits are protected by a sales policy that is fairness itself. Let one of our Distributors tell you about it. Or write to any Johns-Manville branch.

JOHNS-MANVILLE INCORPORATED

Madison Ave. at 41st St., New York City
10 Factories—Branches in 64 Large Cities
For Canada
CANADIAN JOHNS-MANVILLE CO., Ltd
Toronto



MANVILLE EQUIPMENT



The Bearing that
Engineers Choose
Owners Prefer
and Repairmen
seldom see



Schatz
UNIVERSAL
Annular
BALL BEARING

FEDERAL BEARINGS CO., Inc., Poughkeepsie, N. Y.
Great Britain: 37 Sheen Road, Richmond, London

Four Million Wheels a Year — *from standing tree to finished product*

WITHIN the confines of our organization, 4,000 sets of wood wheels for motor cars and trucks are made each day—of wood grown in our own forests, cut and seasoned in our own mills and of steel pressed and fashioned in our own plant.

The units of the Motor Wheel Corporation are as follows:

Gier Pressed Steel Plant
Lansing, Michigan

Prudden Wheel Plant
Lansing, Michigan

Auto Wheel Plant
Lansing, Michigan

Weis and Lesh Plants
Memphis and Jackson, Tennessee
Monroe, Louisiana
Light, Arkansas
Saw Mills at Other Points

The men directly responsible for the organizing and operating of the Motor Wheel Corporation are H. F. Harper, President and General Manager; W. H. Newbrough, Chairman of Board of Directors; B. S. Gier, First Vice President and Treasurer; D. L. Porter, Vice President; W. C. Brock, Vice President; and C. C. Carlton, Secretary, who with O. A. Jenison, J. B. Siegfried and Chas. W. Nichols constitute the Board of Directors. Mr. Siegfried is General Sales Manager.

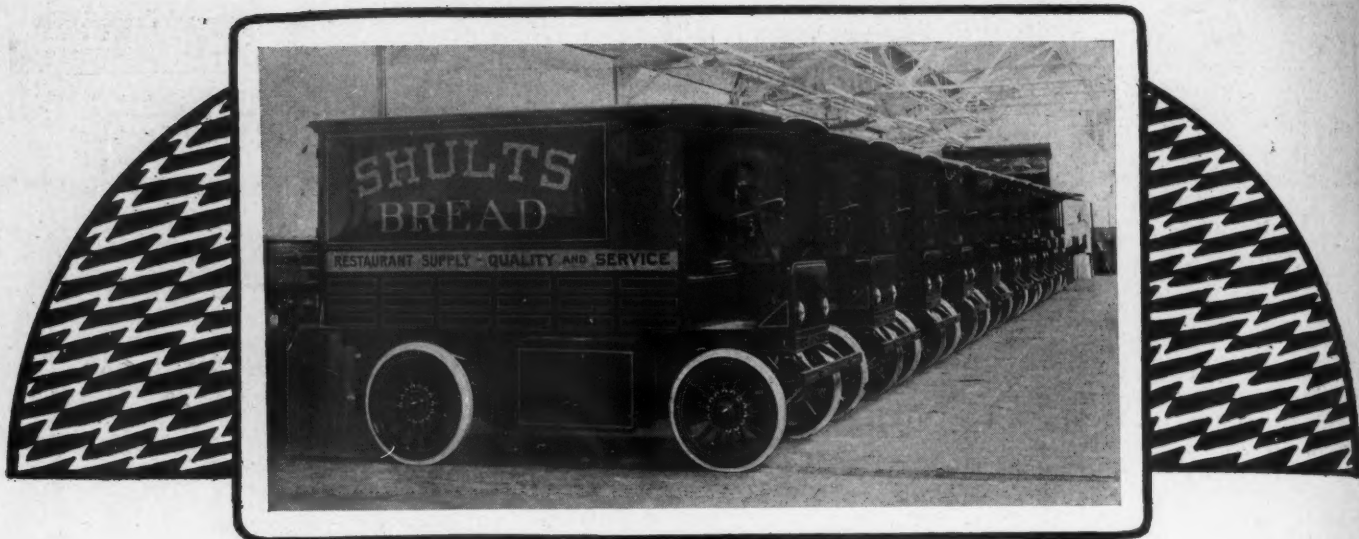


Motor Wheel Corporation

Manufacturers

Motor Vehicle Wheels Complete
Metal Stampings, Steel Products

LANSING, MICHIGAN



REPEAT ORDERS

The Indisputable Evidence of Ward Electric Superiority for Short-Haul Work

The steadily growing volume of repeat orders Ward Dealers are taking is the "handwriting on the wall."

It unmistakably shows that those businesses which use power-driven vehicles for short-delivery purposes are beginning to study their cost sheets more closely.

This includes department stores, groceries, bakeries, butcher shops, laundries, milk dealers, coal dealers, ice companies, and many other lines which make frequent-stop city deliveries.

Here are some of the reasons why Ward Dealers are getting orders with ease. Compare these remarkable Ward Electric economy and service

features with that of any gasoline-driven commercial car.

Cost of current (current at 3c per k.w. hr.) to operate a 750 lb. capacity Ward Electric—1c a mile. Daily radius on a single charge—35 to 45 miles. Current stops when the car stops. Absence of vibration means extremely slow depreciation; few-and-far-between repair bills. Simple mechanism assures a trouble-free, fool-proof, long-time investment. Standard construction—no freak features.

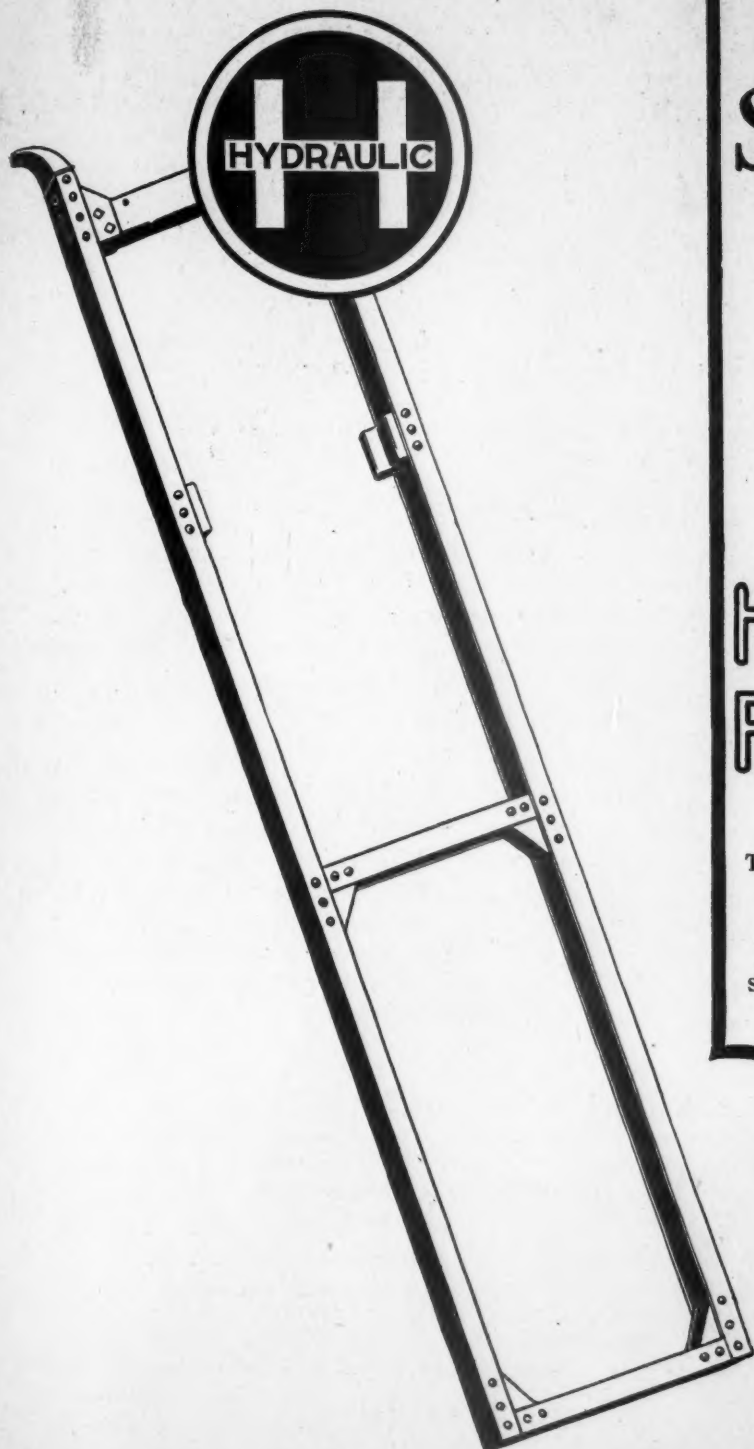
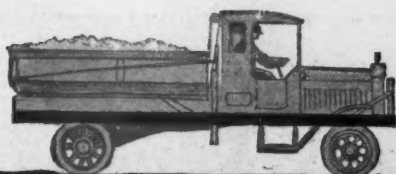
Ask us to tell you in full the many reasons why it will pay you big to concentrate on selling Ward Electrics for short-haul, frequent-stop service. Write.

Capacities, 750 to 10,000 Pounds

WARD MOTOR VEHICLE COMPANY

Mount Vernon, New York

**WARD
ELECTRICS**



Specifications

always mean
more to the
buyer when
they include
mention of

HYDRAULIC FRAMES

THE HYDRAULIC PRESSED STEEL COMPANY
of THE HYDRAULIC STEEL COMPANY
CLEVELAND, OHIO

Branch Sales Offices:

New York	Chicago	San Francisco	Detroit
Singer Bldg.	Fisher Bldg.	Hearst Bldg.	Book Bldg.

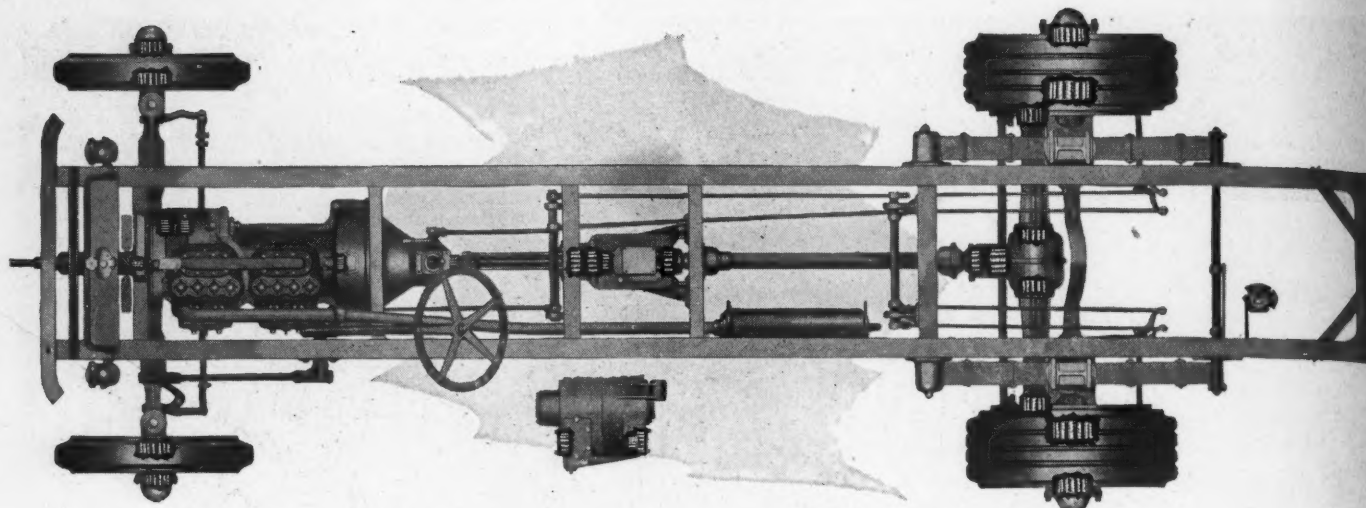
Manufacturers of

Pressed Steel Frames for Passenger Cars,
Trucks and Tractors; Axle Housings;
Brake Drums; Torque Arms; Running-
Boards; Step Hangers; Hub Flanges;
Discs; Dust Shields; Steel Barrels; Aero-
plane and Miscellaneous Stampings.



HYDRAULIC

PRESSED STEEL COMPANY



Where Hyatt Roller Bearings Are Used in Motor Trucks

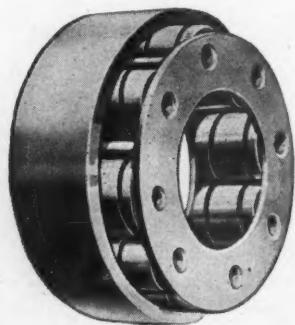
ABOVE is shown a representative motor truck chassis illustrating the many locations in which Hyatt Roller Bearings are satisfactorily performing.

In the front wheels the use of two Hyatt Bearings insures absolute steadiness. At the fan a single Hyatt Bearing with plain washer thrust provides dependability and quietness. On the auxiliary drive shaft they operate without attention or need for adjustment. Since they require a minimum amount of lubrication, they are especially suitable as clutch supporting bearings.

Transmissions fitted with Hyatt Roller Bearings are noted for their quietness,

inexpensive assembly, and freedom from the usual bearing troubles. In the axle, either internal gear, worm drive, or bevel gear drive, they are particularly adaptable, for they have large carrying capacity and ability to endure under the most severe service.

Wherever radial anti-friction bearings can be used, Hyatt Roller Bearings will effectively meet the requirements. The adaptability of Hyatt Roller Bearings, due to their variety of proportions and ability to operate with or without races, permits of extremely simple design. Assembly prints covering any of the above installations will be gladly furnished.



HYATT Roller Bearings have all the advantages found in other types of radial bearings, and an additional feature—the Hyatt Hollow Roller—designed and built after many experiments to determine the most efficient type of roller.

Hyatt Roller Bearings carry the load, automatically keeping themselves in line, distributing and cushioning the loads and shocks and constantly maintaining proper lubrication over the entire bearing surface. The result is carefree service and permanent satisfaction.

HYATT ROLLER BEARING COMPANY

Tractor Bearings Division
Chicago, Ill.

Motor Bearings Division
Detroit, Mich.

Industrial Bearings Division
New York, N. Y.

HYATT QUIET BEARINGS



Confidence of the Continental Oil Company in Nash products is expressed in the fact that it operates a fleet of ten Nash Trucks.

Prices of Nash Trucks Represent Sound Values

Prices of Nash Trucks have always represented unusually sound values.

Nash Trucks are built in volume in the same big shops and under the same corps of executives that turn out a volume production of Nash Passenger Cars.

The savings in manufacturing cost thus effected have always been passed on to the Nash Truck buyer.

Comparison of the many superiorities of Nash Trucks and then comparison of price will convince you that Nash Trucks do offer most attractive investments.

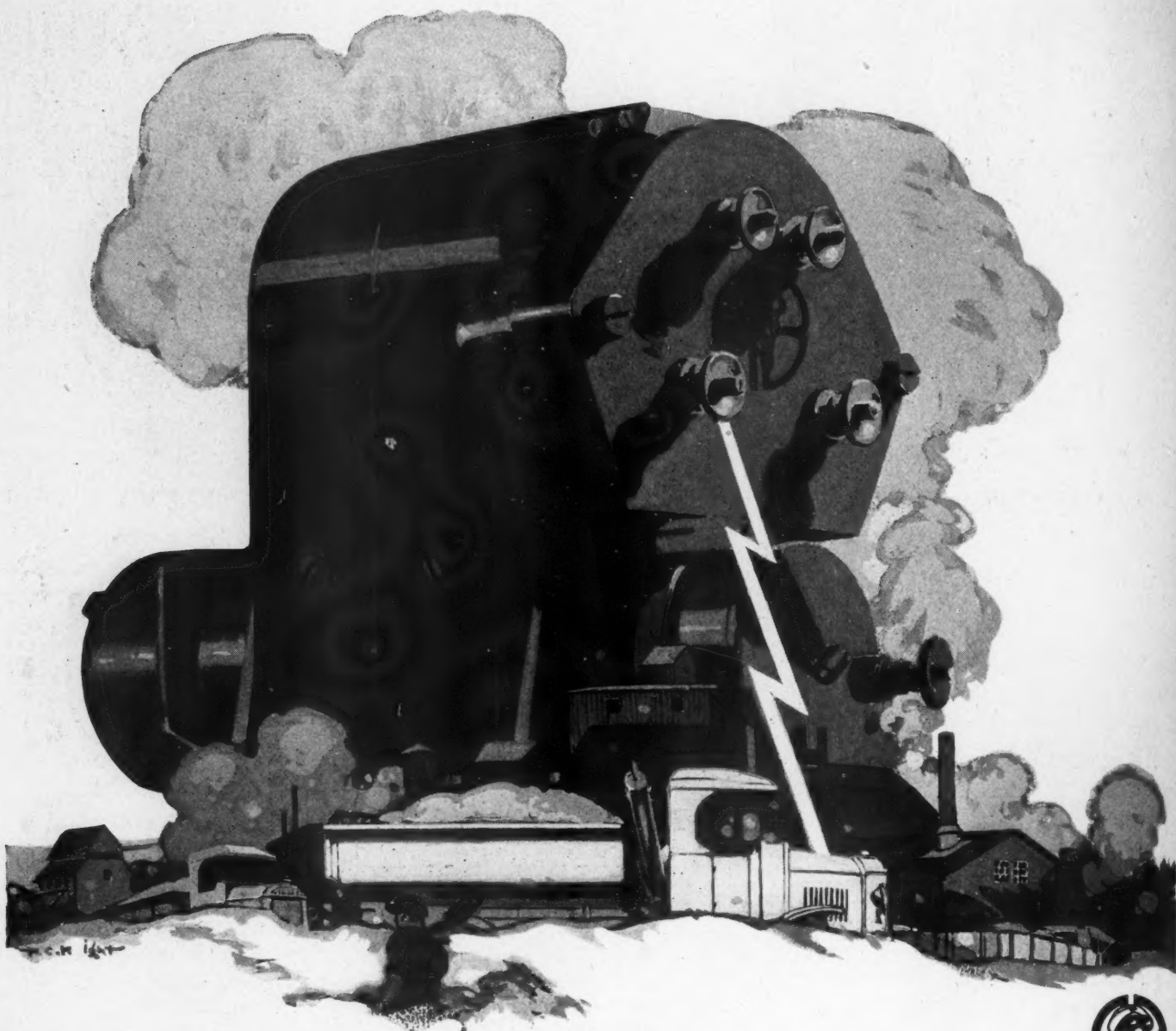
This is especially true when it is considered that every Nash Truck in use is assured a service which is permanent, prompt and intelligent. More than eighteen hundred Nash dealers and distributors, each prepared to render efficient service attention, and each carrying out rigid Nash service policies, are located throughout the country.

Nash Trucks: One-Ton Chassis, \$1895
Two-Ton Chassis, \$2550 Nash Quad Chassis, \$3250
F. O. B. Kenosha

The Nash Motors Company, Kenosha, Wisconsin
Four Cylinder Car Division, Milwaukee, Wis., Manufacturers
of the Nash Six, the Nash Four and Nash Trucks

Nash Motor Sales, Limited, Toronto, Ont., Distributors
of Nash Cars and Trucks for the Dominion of Canada

NASH MOTORS



Put These Forces to Work



Trade-Mark
Reg. U.S. Pat. Off.

This is what Bosch High Tension Magneto Ignition adds to the truck you sell: Prestige built upon years of faithful service—performance known to four million Bosch owners—a service organization that is nation-wide—and a gigantic national advertising campaign that is ever increasing the sales value of the name Bosch. Put these business-building, sales-making forces to work. Insist on Bosch Magneto Ignition. You can get it.

Be Satisfied

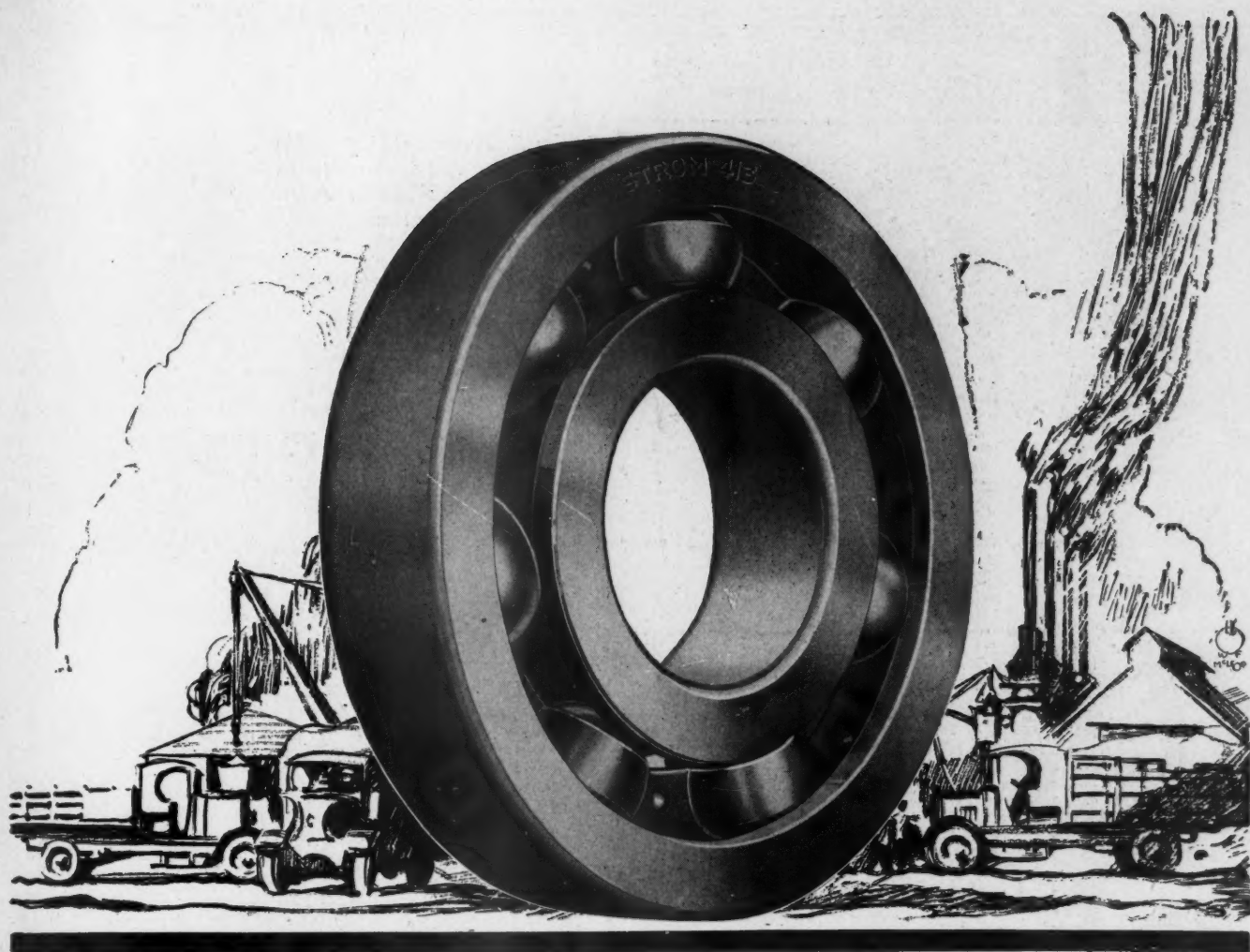
400 Service Stations in 400 Centers

Specify Bosch

AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: Springfield, Mass.
Branches: New York, Chicago, Detroit, San Francisco

BOSCH



Strom Bearings Increase the Economy of Motor Operation

Whether used in passenger cars, trucks or tractors, Strom bearings decrease the cost of operation. They reduce friction to a minimum. Less power is required to drive the car. This means more miles per gallon of gasoline and quart of oil. There is a Strom bearing of the highest quality correctly designed for every application.

Our modern, approved method of heat-treating gives maximum strength to the highest quality steel.

Strom engineers are experts in bearing design. They can be of invaluable assistance in helping solve your bearing problems.

Do not hesitate to ask their advice.

Radial bearings made in a wide range of sizes for light, medium and heavy duty.

Angular contact bearings especially designed to support combinations of radial and heavy end-thrust loads.

Thrust bearings made in all types and sizes with flat and grooved races.

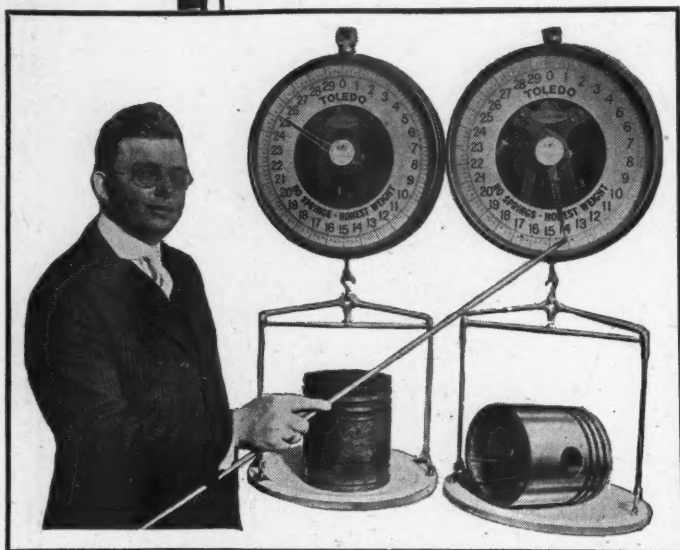
U. S. BALL BEARING MFG. COMPANY

(Conrad Patent Licensee)

4542 Palmer Street, Chicago, Ill.

Strom

BEARINGS



Stanley S. Turner pointing out the difference in weight between a large size DE LUXE PISTON and a stock piston of same size.

Why

DE LUXE
 LIGHT WEIGHT GREY IRON PISTON
DE LUXE ©

"The Successful Light Weight Piston"

Eliminates Vibration

De Luxe light weight, grey iron pistons eliminate vibration because they eliminate weight but with no sacrifice of strength.

The resulting "jar" when a piston stops at the top or bottom of a stroke is what causes vibration. Obviously that jar is much less if a piston weighs a pound than if it weighs two pounds.

De Luxe light weight pistons are

40 to 50% LIGHTER WEIGHT THAN STOCK FACTORY CAST IRON PISTONS.

Therefore they eliminate a corresponding amount of vibration, reducing it to a point where it can not be detected at all, in some motors.

They produce a sweeter running motor with more pick-up, power and speed and with less gasoline and oil consumption.

Ask any good automobile mechanic about De Luxe light weight grey iron pistons.



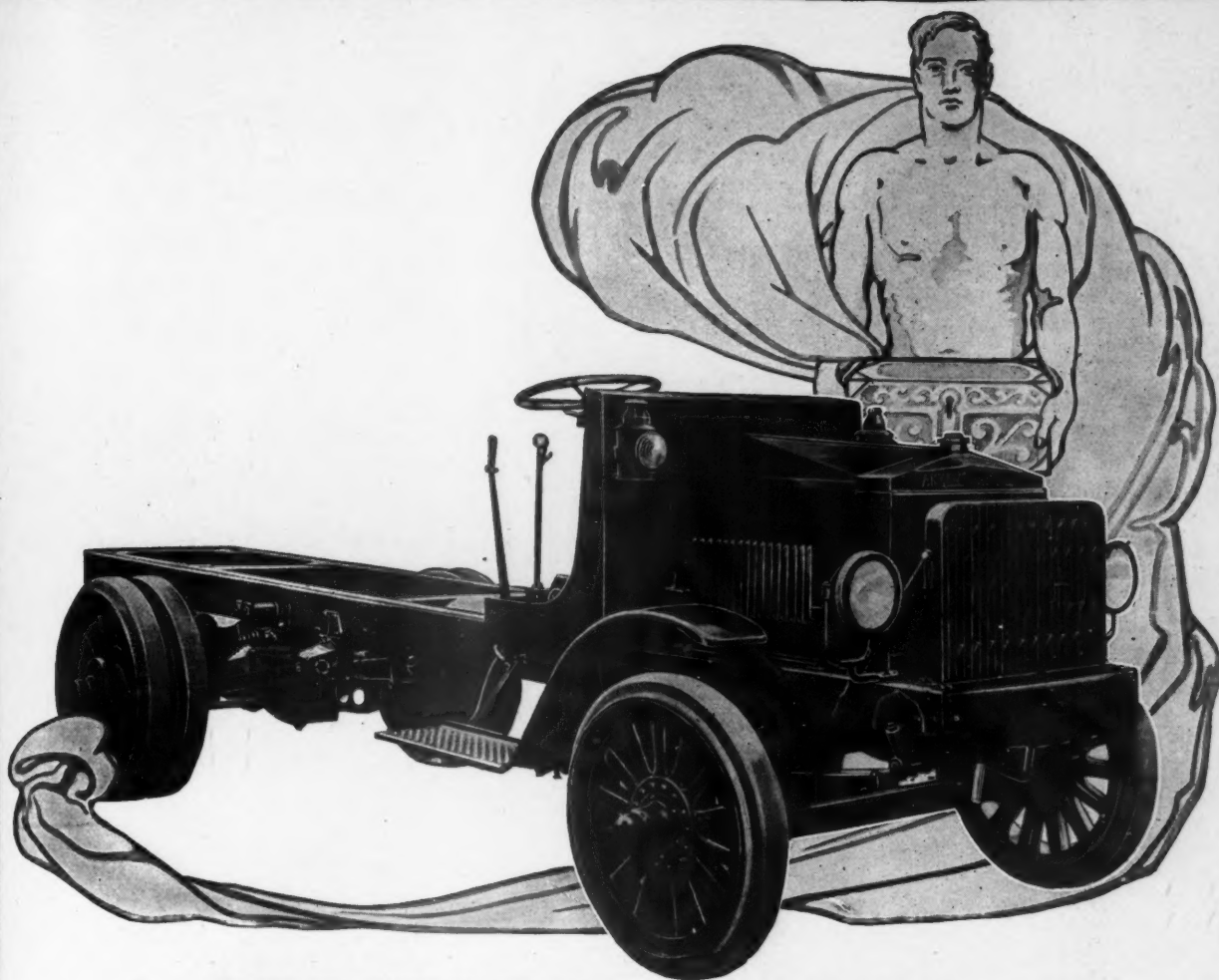
"Look inside, you can't go wrong--very light and very strong"

CLARK-TURNER PISTON CO.

1246 So. Los Angeles St.

Los Angeles, Cal.

Order from our nearest Distributors—Listed in Chilton Automobile Directory and (Red) Automobile Trade Directory



A PRICELESS HERITAGE

STAMINA, that quality which typifies dynamic force and power, predominates among the characteristics of American-LaFrance Commercial Trucks.

It is a heritage from the makers of American-LaFrance Motor Driven Fire Apparatus which supplies efficient fire protection to 90% of America's cities and towns.

The power plant which forms the motive power is similar in mechanical construction to that of the fire apparatus—a motor pre-eminent in the automotive field.

More power than will ever be needed; more speed than will ever be used; higher operative efficiency than ever before—more than necessary of everything necessary to make trucks that excel.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

OF NEW JERSEY

NEW YORK OFFICE
250 WEST 54TH STREET

FACTORY
BLOOMFIELD, N. J.

The Fabrikoid process
adds beauty and long life to fabrics;
some heavy and rugged, others dainty
as linen — all pliable, scuff-proof,
stain-proof and water-proof.

**DU PONT
FABRIKOID**



—a scar-proof
upholstery material

OFTEN-TIMES a driver abuses his truck and its upholstery but, even then, Fabrikoid preserves its good appearance in spite of him.

For Fabrikoid is scar-proof, grease-proof, and dirt-proof. You might almost say it is wear-proof, for Fabrikoid upholstery lasts the life of a truck.

And it is always good-looking, for Fabrikoid may be washed clean with soap and water.

You'll be interested in seeing samples and complete details. Write.

DU PONT FABRIKOID CO.
WILMINGTON, DELAWARE

Branch Offices:

21 E. 40th Street . . New York City
Dime Bank Building . . Detroit, Mich.
Gugle Building . . Columbus, Ohio
McCormick Building . . Chicago, Ill.
Merchants Bank Building Indianapolis, Ind.
Harvey Building . . Boston, Mass.
Chronicle Building . . San Francisco, Cal.

Plant: Newburgh, N. Y.

F A B R I K O I D



The biggest opportunity in Truck history

Now—is the time, Mr. Dealer, to get in line for handling Traffic Trucks for 1921. The demand for motor trucks next year will be greater than ever before.

Traffic Trucks—*the lowest priced 4,000-lb. capacity truck in the world*—is the answer. Absolutely without competition on a price, performance and upkeep basis.

Traffics have made good for thousands of owners everywhere.

GET THIS—the one-model Traffic, meeting the demand of 80 per cent of all buyers, can be handled with less capital than any other make. You only need to carry trucks of one model and service parts for one model, thereby saving thousands of dollars on your investment.

Live dealers will not pass up this opportunity for a direct factory connection.

Wire today—tomorrow may be too late.

—over

COVERT
Transmission and Clutch
Ball and Roller Bearings
on all Shafts

CONTINENTAL
Red Seal
3 1/4 x 5 Motor

BOSCH
High-Tension Magneto

RUSSEL
Internal Gear Drive
Rear Axle

FISK
Solid Tires
34 x 3 1/2 Front; 34 x 5 Rear
Pneumatics at extra cost

**TIMKEN AND
HYATT**
Bearings

**STANDARD AND
THERMOID**
Universal Joints

STEERING GEAR
Traffic Made
Worm and Gear Type

**PRESSED STEEL
DASH**
Hood and Gasoline Tank
Traffic Made

RADIATOR
Traffic Made
Cast Shell, Cellular Core

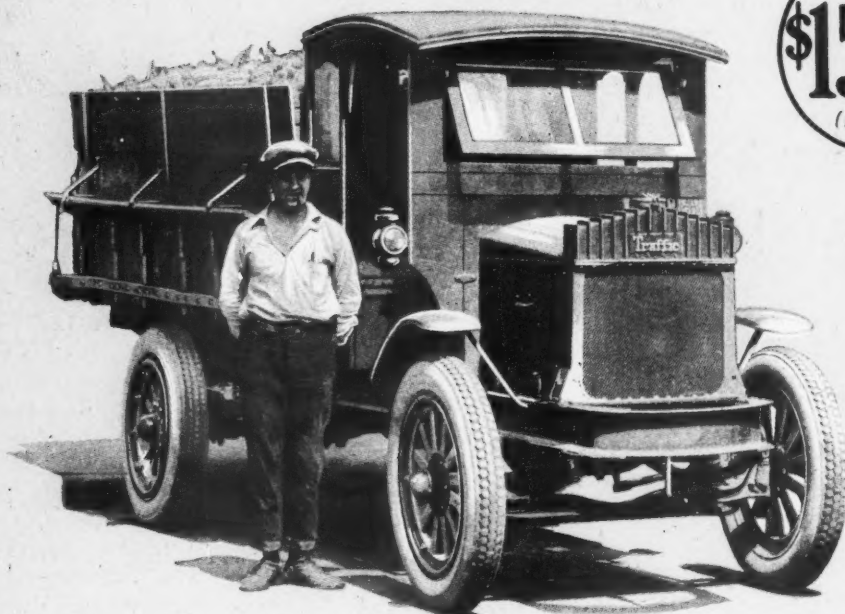
FRAME
Traffic Made, 6-inch
U-Channel, 212 inches long
over all

133" WHEEL BASE
122-in. Length of Frame
Back of Driver's Seat

Traffic Truck

4,000 LBS. CAPACITY

(chassis)
\$1595
(factory)



A chain without a weak link

Examine the Traffic chain link by link and satisfy yourself that the Traffic represents the most remarkable truck value in existence.

No economies have been practiced by the injection of a single piece of cheap material or unit of unknown origin or unestablished quality.

The Traffic's low price has been made

possible through standardized production on a quantity basis of a standard capacity truck of one model only, resulting in the lowest priced 4,000-lb. capacity truck in the world.

There is some valuable territory available. Get in on this one big opportunity. Wire today regarding a direct factory connection.

Traffic Motor Truck Corporation, St. Louis, U. S. A.

Largest exclusive builders of 4,000-lb. capacity trucks in the world

CARTER
Efficiency Carburetor

DETROIT
Steel Products Springs

WHEELS
Heavy Truck Type
Second Growth Selected
Hickory

FRONT AXLE
Traffic Made
Forged I-Beam
Timken Bearings in Wheels

MAXWELL MOTOR SALES CORPORATION
Maxwell & Chalmers
 AUTOMOBILES
 1500 Broadway
 NEW YORK, N.Y.
 Oct. 20, 1919

Brake Inspection Society,
 New York, N. Y.

Dear Sirs:

It has often occurred to me that a great many of the automobile accidents are caused through inefficient brakes.

I think it would be an excellent idea if a committee were organized, whereby all brakes would be inspected at regular intervals. In order to insure a quick reply in case of an emergency.

I believe that I could be the custodian of a good many of the service and repairs in this country and I am sure that the motor car users at large will appreciate the importance of always having their brakes as nearly as possible in perfect condition.

Very truly yours,
 HARRY J. DEBEAR, Manager
 Maxwell Motor Sales Corporation

PAIGE TRUCKS
 PAIGE-DETROIT COMPANY OF NEW YORK, INC.
 1500 Broadway
 NEW YORK, N.Y.
 Oct. 20, 1919

Brake Inspection Society,
 New York, N. Y.

Gentlemen:

We are greatly in favor of your campaign the object of which is to insure the proper care and inspection of brakes on automobiles.

We feel that the great majority of the accidents which occur can be prevented provided your campaign is given proper support by the public and the automobile factor.

Yours very truly,
 E. M. DALLEY, President
 PAIGE-DETROIT CO. OF N. Y. INC.

Harry J. DeBear, Manager
 Maxwell Motor Sales Corp.,
 New York Branch

E. M. Dalley, President
 Paige-Detroit Co. of New
 York, Inc.

Motorists, dealers, manufacturers must work together to eliminate this serious menace

Inefficient brakes are an evil that hurts the entire automobile industry

IN alarming proportions the number of automobiles is increasing. The streets of every city and town, and even many highways are becoming crowded beyond the danger mark. **Serious accidents are appalling in their frequency.**

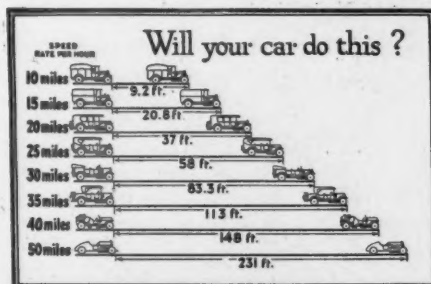
Police officials, automotive engineers, municipal authorities everywhere agree that a large proportion of automobile accidents directly result from faulty brakes.

Dealers, manufacturers, motorists must work together to eliminate accidents due to faulty brakes—a serious menace to the entire automobile industry.

Efficient brake lining is an essential factor in the prevention of these accidents—brake lining that will not slip or grab and that retains its correct "coefficient of friction" until worn wafer-thin.

The Grapnalized Hydraulic Compressed Brake Lining

In each square inch of Thermoid Hydraulic Compressed Brake Lining there is 40% more material



Copyrighted 1919 by Thermoid Rubber Co.

This chart, worked out by leading automotive engineers, shows how quickly a car should stop at various speeds, if the brakes are in good condition and working right.

than in ordinary woven lining. This additional body gives a closer texture, which is made tight and compact by **hydraulic compression** of 2000 pounds pressure. Thermoid is also "grapnalized"—an exclusive process which enables it to resist moisture, oil and gasoline.

Brakes lined with Thermoid do not grab, slip or swell from dampness. Because of its wearing qualities and un-failing efficiency, the manufacturers of 50 of the leading cars and trucks are consistent purchasers of Thermoid.

Co-operate with the movement for safer motoring. Render a real service to your customers. Build up a more profitable business in brake lining.

Send for the Thermoid Brake Inspection Stopping Chart, also the 1920 Thermoid Sales Plan—full of interest to every dealer and garage.

THERMOID RUBBER COMPANY

Factory and Main Offices: Trenton, N. J.

New York Chicago San Francisco Atlanta Cleveland Detroit Philadelphia
 Pittsburgh Boston London Paris Turin

Canadian Distributors

The Canadian Fairbanks-Morse Co., Limited, Montreal
 Branches in all principal Canadian cities

Thermoid Brake Lining

Hydraulic Compressed

Makers of "Thermoid-Hardy Universal Joints" and "Thermoid Crolide Compound Tires"



Graham Brothers 1½-ton Speed Truck does its work in one-third less time, on one-third less fuel; saves tires, and requires much less mechanical service.

The vitally significant facts which make it so much better in every practical way are these:

First, it has been deliberately planned and definitely constructed, in every mechanical detail, to run on pneumatic tires; to carry a 1½-ton load safely and efficiently at all range of speed up to twenty-five miles an hour.

Second, it is built of finest materials, so selected and so co-ordinated, that it is 500 to 1000 pounds lighter than any other 1½ ton truck on the market.

Third, nearly all Speed Trucks are equipped at the factory complete with bodies and cabs as specified.

Years of experience have taught Graham Brothers the practical needs of every business, so that more than ninety per cent of

all truck requirements are answered by the various styles built and sold on Speed Truck chassis.

Its unusually complete equipment includes Distel Wheels, electric lights, odometer, motometer, and engine driven tire pump, in addition to the usual specifications of a high-grade truck.

It is important to the dealer that Graham Brothers 1½-ton Speed Truck is the size that meets fully 70% of all haulage needs.

It is still more important that it is honestly and ruggedly built to meet those needs with unusual satisfaction to owners.

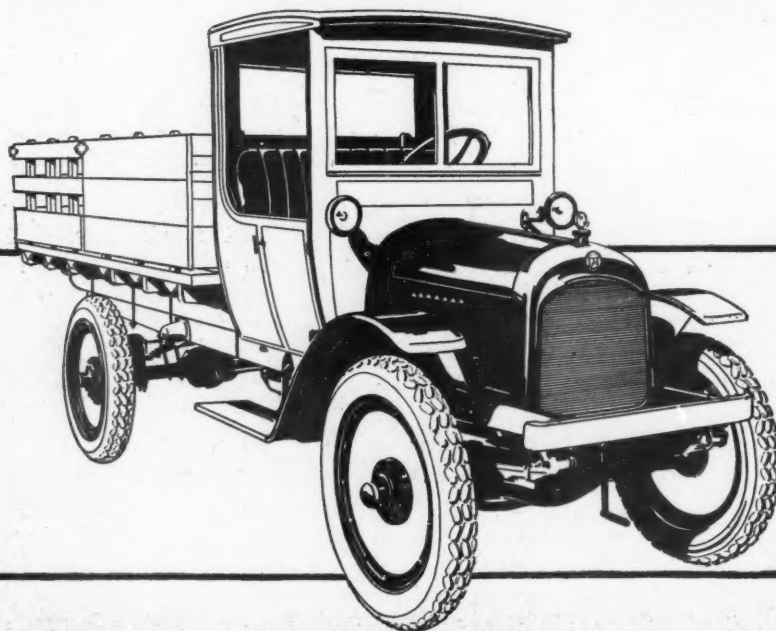
It is a highly efficient truck, painstakingly built for rugged service—a truck the dealer can stand back of with all his business sincerity.

The dealer always receives first consideration from Graham Brothers. They will be glad to hear from all who are interested in having details of their sales policy.

GRAHAM BROTHERS
Evansville, Ind., U. S. A.

GRAHAM BROTHERS

1½ TON SPEED TRUCK



MEAD-MORRISON SERVICE

LIFTS THE LOAD OF INDUSTRY



Each piece of material-handling equipment turned out by Mead-Morrison Engineers has proven itself not only remarkable for the ease with which it performs difficult work and saves time and money, but, also for the gratifying way in which it maintains a steady average of accomplishment.

MEAD-MORRISON Under-Slung TRUCK WINCH

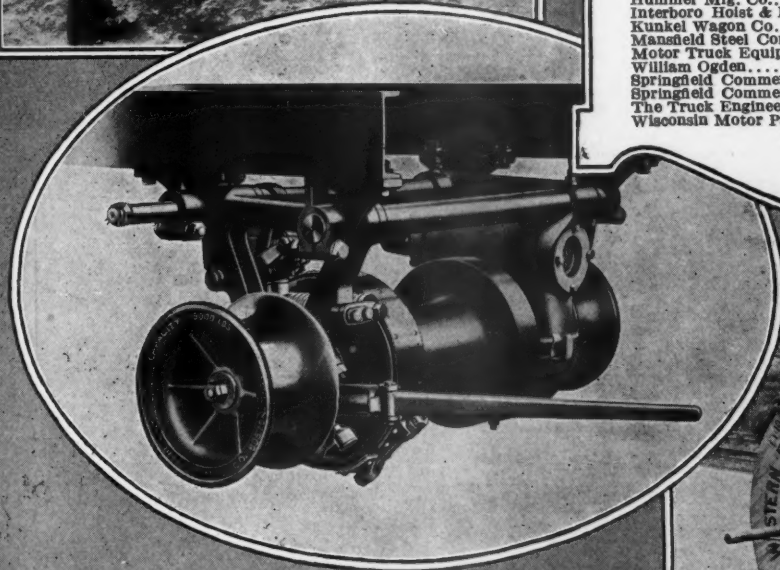
The under-slung winch—the latest Mead-Morrison product—is typical of Mead-Morrison ingenuity and efficiency.

It fills a long-felt want among telephone companies, street railways and logging camps. Instead of being placed on the floor of the truck, it is attached to the rear where it is easily accessible for work of the sort done by the above named industries.

Write for Literature

Distributors

Auto Truck Equipment Co.....	Pittsburgh, Pa.
Edward R. Bacon Company.....	San Francisco, Cal.
Hummel Mfg. Co.....	St. Louis, Mo.
Interboro Holst & Body Co.....	Brooklyn, N. Y.
Kunkel Wagon Co.....	Baltimore, Md.
Mansfield Steel Corp.....	Detroit, Mich.
Motor Truck Equipment Co.....	Philadelphia, Pa.
William Ogden.....	Indianapolis, Ind.
Springfield Commercial Body Co.....	Springfield, Mass.
Springfield Commercial Body Co.....	Cambridge, Mass.
The Truck Engineering Co.....	Cleveland, Ohio
Wisconsin Motor Parts Co.....	Chicago, Ill.



Engineers
and
Contractors

MEAD-MORRISON
MANUFACTURING COMPANY
1222 Prescott Street East Boston, Mass.

Coal Handling
and
Hoisting
Machinery

YOUR PART

What place has the dealer in the policy on which the Dunlop Tire and Rubber Corporation of America is founding a national business?

He is an absolutely essential factor in that policy—a policy which places maker, dealer and user side by side on a platform of mutual interest.

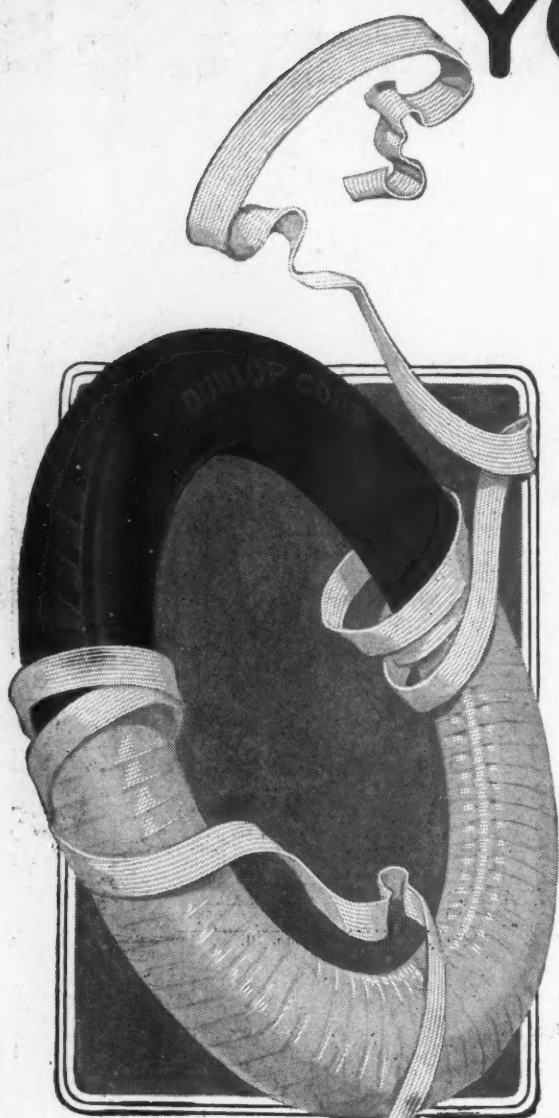
The Dunlop dealer links Dunlop to tire-users. He represents them to us, and us to them. He rightfully seeks from us the necessary co-operation to satisfy that customer, and to build a permanent, successful business in his community.

We rightfully seek from him an attitude of mind toward Dunlop such as we ourselves have—a thorough belief in Dunlop quality, in Dunlop resourcefulness, in Dunlop will and ability to co-operate with him, and in Dunlop obligation, which he shares, to sell not merely tires but the greatest amount of transportation value.

Every Dunlop dealer will select us on that basis as truly as we select him.

What assets will Dunlop contribute to his business? Briefly they are:

The Dunlop Name—The Dunlop name has been associated with the invention of the pneumatic tire, with the oldest tire-builder, with a world-wide institution that is re-



DUN

IN OUR PROGRESS

presented in every quarter of the globe by manufacturing and selling enterprise—

The Dunlop Tire and Rubber Corporation of America—This company enters the industry as no other company has, with a complete and fully financed plant. The buildings already erected will provide for a capacity of 12,000 tires a day and that figure can easily be doubled when necessary—

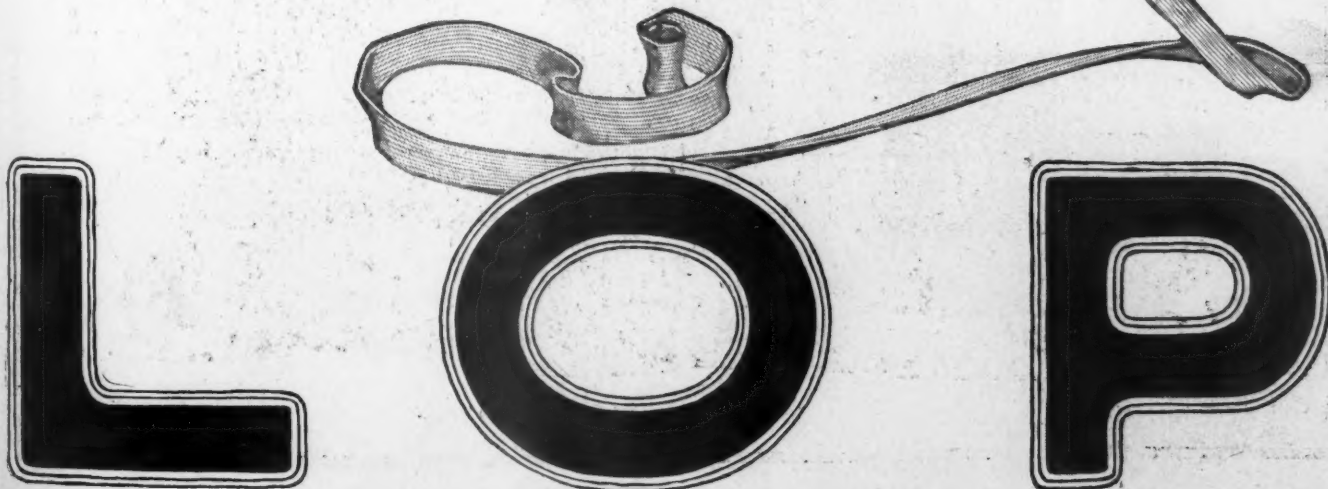
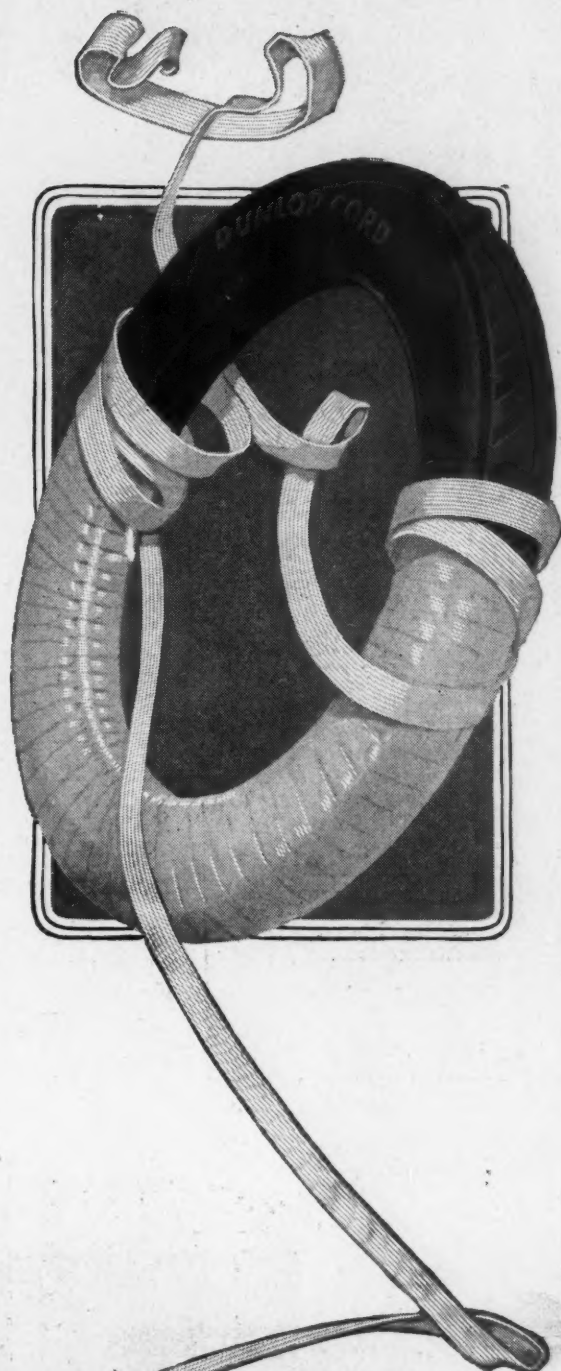
The Dunlop Product—Dunlop will make only a high-grade product, consisting of cord pneumatics and tubes for passenger cars, trucks and motorcycles; solid truck tires and repair and accessory materials.

Dunlop Advertising—This will be unusual both in extent and character, continuous and consistent in policy and a permanent good-will asset in the dealer's business. See, for example, the four-page advertisements of Dunlop now appearing in The Saturday Evening Post, Literary Digest and Colliers.

* * *

Dunlop tires are not yet for sale. They will be distributed, however, early in 1921. Meantime we will welcome the opportunity to discuss Dunlop distribution policy with retail tire merchants who are interested.

DUNLOP TIRE AND RUBBER CORPORATION OF AMERICA
BUFFALO, NEW YORK



Trailmobile

Trade-Mark Reg. U. S. Patent Office

"Readjustment" Means More Trailmobiles

The Motorless
Motor Truck
—
**Thousands
in Use**
—

DIVISION 1—Light, one-way four-wheeled Trailmobiles for use with passenger cars or light trucks: 1,250 lbs., $\frac{3}{4}$ ton and 1 ton.

DIVISION 2—Heavy-duty four-wheeled Trailmobiles for use with trucks: $1\frac{1}{2}$ tons, one-way; 2 tons; $3\frac{1}{2}$ tons, and 5 tons reversible and one-way.

DIVISION 3—Semi-Trailmobiles: $2\frac{1}{2}$ tons; 4 tons; 6 tons; and 10 tons.

DIVISION 4—Pole Trailmobiles: $1\frac{1}{2}$ ton and 3 ton.

"DEFLATION" and "Readjustment" in motor hauling means cutting hauling costs to the bone and that means more Trailmobiles.

Big, well-organized concerns who study their costs and are always keeping up with the times, are now more interested than ever in the Trailmobile.

The dealer has a better opportunity now with an economy line like the Trailmobile than with almost any other. It can always be sold by sound salesmanship.

The line is complete—offering a Trailmobile for practically every hauling requirement. It permits a good profit—as great a margin as on the most desirable trucks. And the expenses after the sale are very low. Investment in stock is not large.

Write now for the full details of the dealer proposition. Trailmobiles will give you greater volume when you need it.

THE TRAILMOBILE COMPANY

2901 Robertson Ave., Oakley

Cincinnati, Ohio



Good roads are preserved by reducing the load carried on each wheel



A significant tribute

"We expect to finish the big dam this week. Before I leave I want to pay my respects to the Bull Dog Mack. It is the most wonderful truck I have ever seen in my extensive experience with all kinds of motor truck equipment."—*From one letter of hundreds we should like you to read.*

THE Mack is distinctively an *engineered* truck. Its supremacy rests upon three essential elements of truck efficiency—dependability, economy and endurance. It was designed to do big things in a big way—easily. That it does this is vouched for by the enthusiastic approval of Mack owners everywhere. Distinctive Mack engineering features, combined with 18 basic Mack patents, have developed the motor truck the world is talking about.

Capacities 1½ to 7½ tons. Tractors to 15 tons.

Our latest catalogues, Nos. 13 and 39, contain detailed descriptions of the many exclusive features that have made Mack supremacy possible, together with the complete specifications of every model. Send for them today.

INTERNATIONAL MOTOR COMPANY, NEW YORK



PERFORMANCE COUNTS

CARRIES THE LOAD

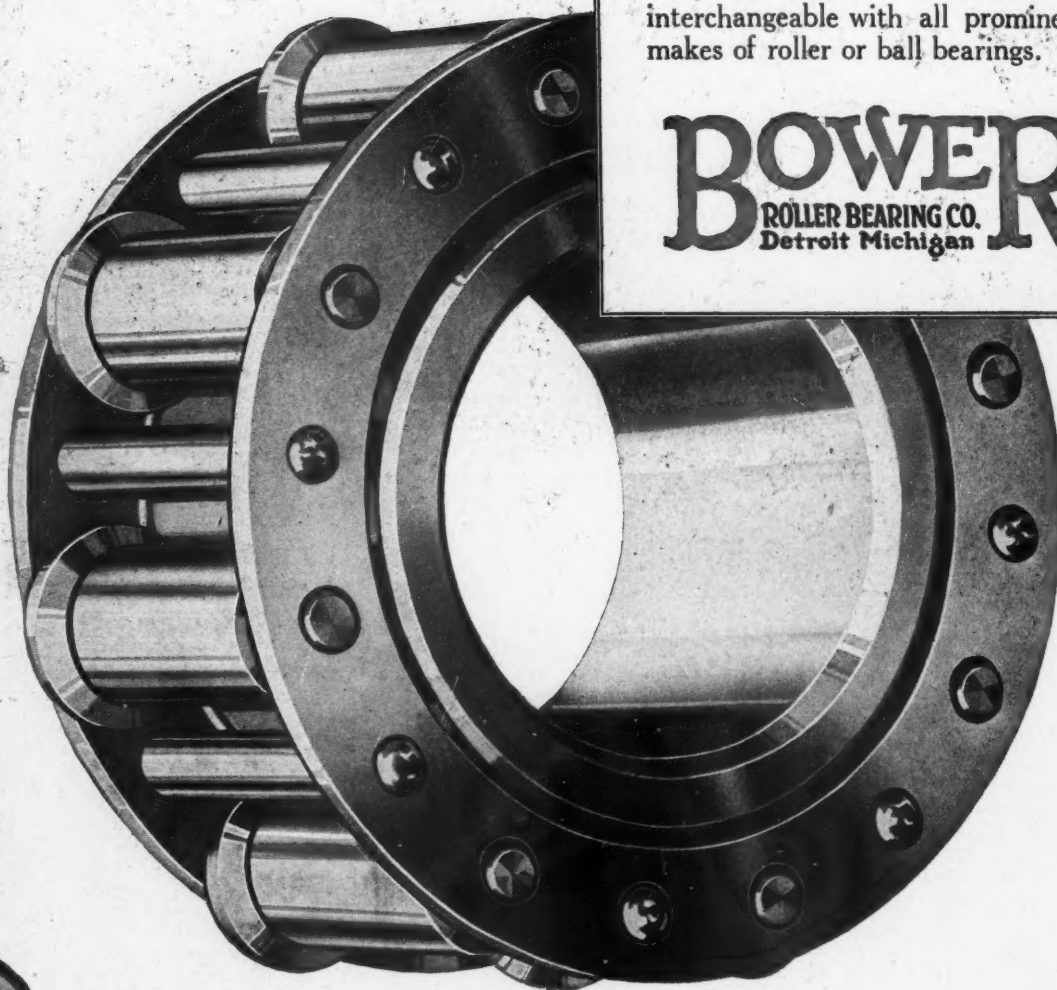
TAKES THE THRUST

WE believe Bower service is as complete as is humanly possible.

We offer a complete line of roller bearings for almost any conceivable service.

They are made in sizes that are interchangeable with all prominent makes of roller or ball bearings.


BOWER
ROLLER BEARING CO.
Detroit Michigan



Exclusive Bower Features

Separate bearing surfaces for load and thrust. Parallel raceways. Self-aligning. Never need adjusting. Does not develop end-thrust under loads. Will not bind or end-slip.





DROP forgings, forging machinery, and hand tools of a quality made possible only by half a century of experience. This is The First Commercial Drop Forging Plant in America. Triangle B products make good.

The
Billings & Spencer Co. Hartford

SCHWARZ WHEELS

WITH INTERLOCKED SPOKES

NOTE THE
WOOD WHEELS
EVERYWHERE



For Giant Pneumatics

Truck owners and dealers who desire to change the solid tire equipment of their heavy trucks to pneumatics, can obtain the famous Schwarz Wheel with interlocked spokes. We carry a large stock that greatly

facilitates this change in tire equipment.

All Schwarz Wheels are built with the interlocked spokes which fit into each other at the hub and form a practically solid spider that is unequalled in strength.

THE SCHWARZ WHEEL COMPANY
FRANKFORD PHILADELPHIA



INTERNATIONAL MOTOR TRUCK

Motor trucks like that pictured on this page are known in every industry as thoroughly successful conveyors of loads. The distinctive hood indicates that this is the *International Motor Truck*. No truck dealer and no man with transportation problems does himself justice if he fails to seriously consider International. Address all inquiries to the Chicago office.

Motor Truck Department

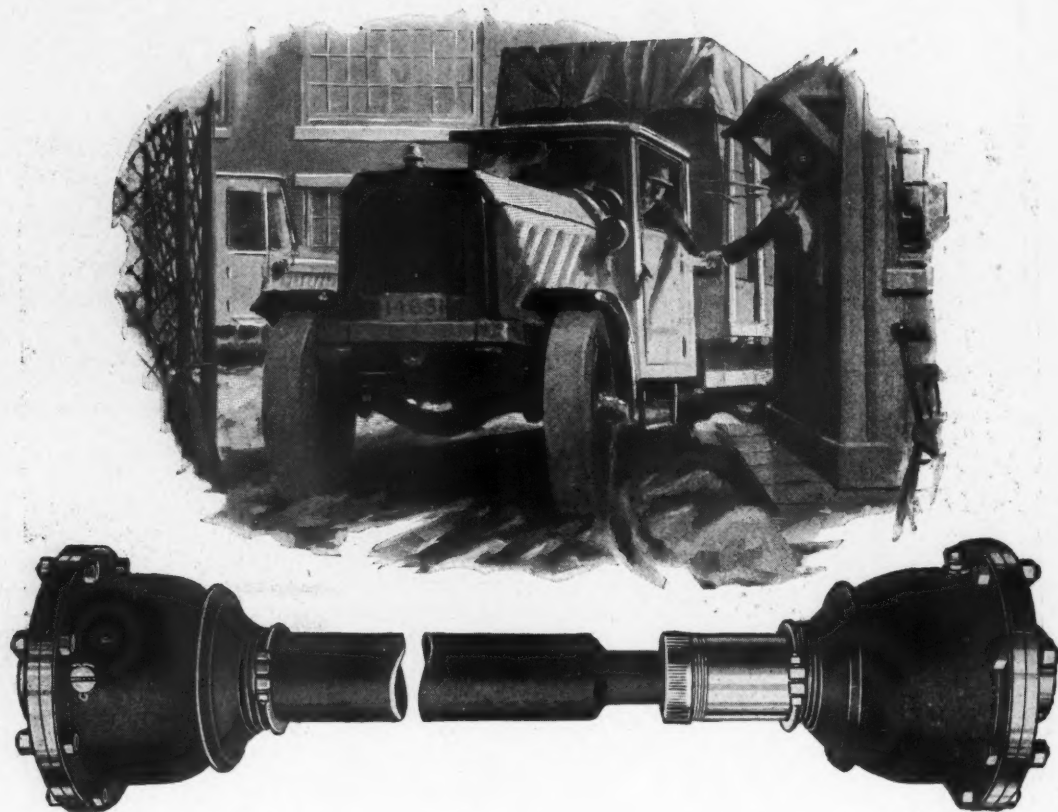
INTERNATIONAL HARVESTER COMPANY
of America

(Incorporated)

CHICAGO

U S A

Branch Houses, Distributors and Dealers Everywhere

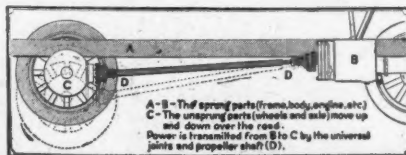


There's just one name that stands for Universal Joints and Propeller Shafts in the automotive industry even as there is just one name that stands for the leading quality product in every industry ~

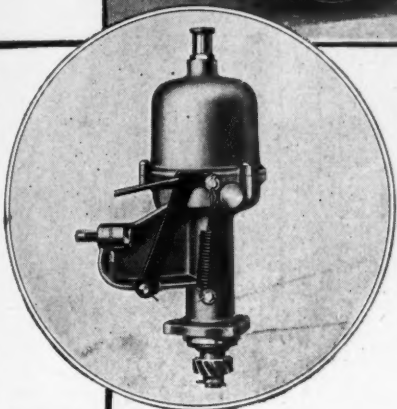
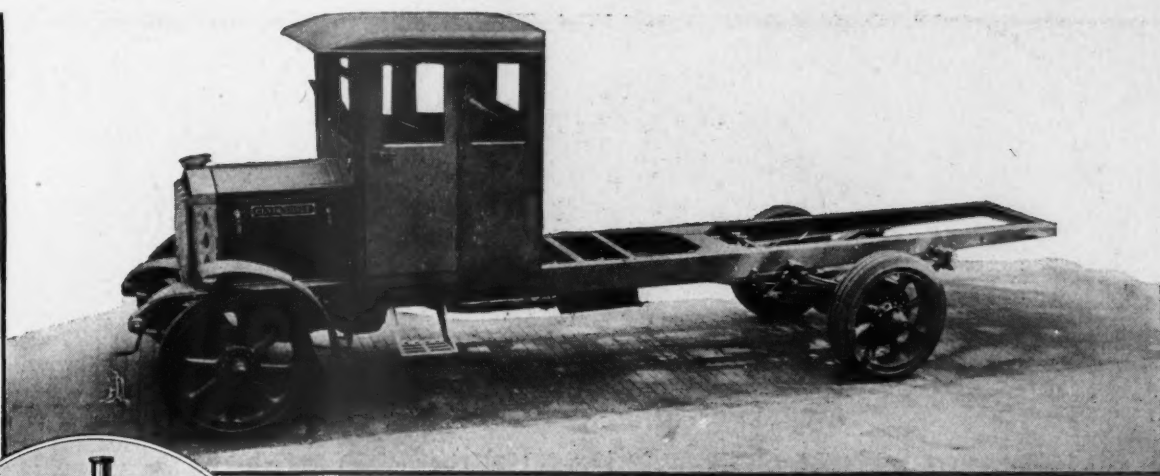
SPICER MANUFACTURING CORPORATION - SOUTH PLAINFIELD, N.J.

Spicer

UNIVERSAL JOINTS AND PROPELLER SHAFTS



Write on your business letterhead for booklet concerning Spicer Universal Joints and Propeller Shafts



No other truck
has it—"The
Driver under
the Hood."

A Distorted Frame Means a Crippled Truck

MR. Average Truck Buyer is apt to take truck frames for granted until he has trouble from overloading or road strain. Then he wakes up to the fact that there is just as much difference in frames as there is in motors, differentials, axles, or transmissions.

It is only fair that a man be told these things *before* he buys a truck instead of afterwards. That is one reason why the Clydesdale frame is made a distinct talking point with dealers.

A Comparison Worth Noting

A rolled steel frame

The ordinary frame, made of *rolled steel*, is of the same depth throughout its entire length. Therefore, it is no stronger at any one point than at another. When heavily loaded, it is more likely to bend or sag at the middle, where the load bears hardest.

A Clydesdale frame

The Clydesdale frame is built like a truss. Made of pressed steel, it is shaped so that its channel is deeper at the points of greatest strain, giving strength where strength is needed, and lighter weight where strength would be superfluous. Furthermore, the Clydesdale frame, although gusseted at corners and cross members, is sufficiently pliable so that road shocks and load twists cannot cause permanent distortion.

Clydesdale frames mean longer life, less chance of parts getting out of alignment, and greater strength to meet the emergency.

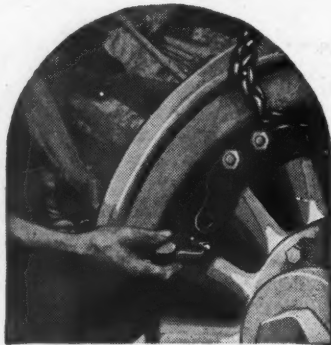
THE CLYDESDALE MOTOR TRUCK COMPANY
CLYDE, OHIO

CLYDESDALE

MOTOR TRUCKS



Giant Grip Clamps permanently attached to rear wheels. Outlast the truck.



Giant Grip Chains are hooked on or off in two minutes. No tools. No jacking.

A Good Paying Proposition For Truck Owners and Dealers

A large measure of a dealer's success, your success, depends upon the demand for the products you sell.

Truck owners are watching costs more carefully now than ever before. They realize truck tie-ups due to slippery pavements, hills, mudholes and mires are too expensive to tolerate.

Nation-wide advertising is telling them of Giant Grip Traction Equipment for motor trucks. The clamps attach permanently to the rear wheels and outlast the truck. The chains are carried in the tool box until needed. Hooked on in two minutes without tools or jacking up. They give sure traction and pull the truck out of the worst places. No other equipment is so simple, effective or economical.

A single delay averted pays their cost. That's why dealers find them such quick and easy sellers.

Made to fit every type of wheel and tire—yet you have fewer models to handle. Your investment is small and turnover speedy.

Take advantage of the big winter market. Write for booklet and our dealer's proposition.

GIANT GRIP MFG. CO.

Formerly named Challoner Company

Established 1863

Oshkosh, Wisconsin

New York Distributor: SHULTIS AUTOMOTIVE CORPORATION
16-22 W. 61st Street, New York City

Pacific Coast Representatives: NORMAN COWAN COMPANY,
Rooms 445 to 451 Rialto Building, San Francisco, Cal.

Giant Grip

Traction Equipment for Motor Trucks



CERTIFIED MALLEABLE CASTINGS

THE AMERICAN MALLEABLE CASTINGS ASSOCIATION

ACA
CERTIFIED

Are daily proving their superiority as load sustainers and "shock absorbers" in many fields. The Certified Castings shown on the truck below have rendered exceptional service under the severe conditions of long cross-country travel. Certified Malleable will guarantee your own product.



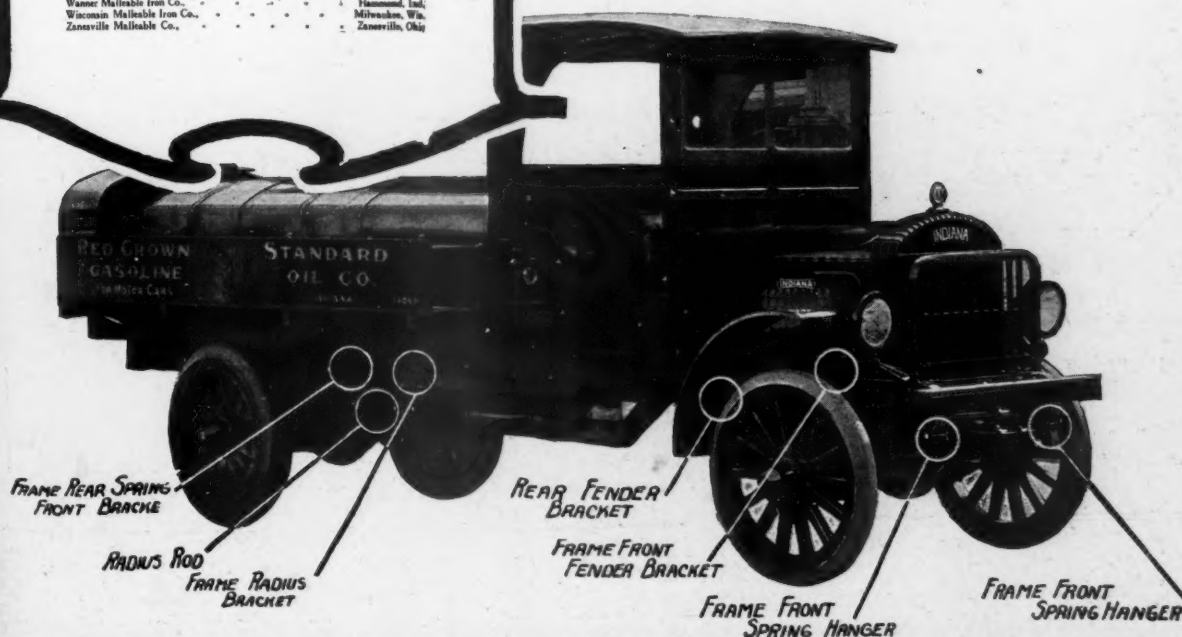
Any serious complaint as to the quality of Malleable Iron furnished by any of the firms listed will be rigidly investigated if brought to the attention of the Association.

Members Receiving Certificates for Quarter Ending Sept. 30, 1920.

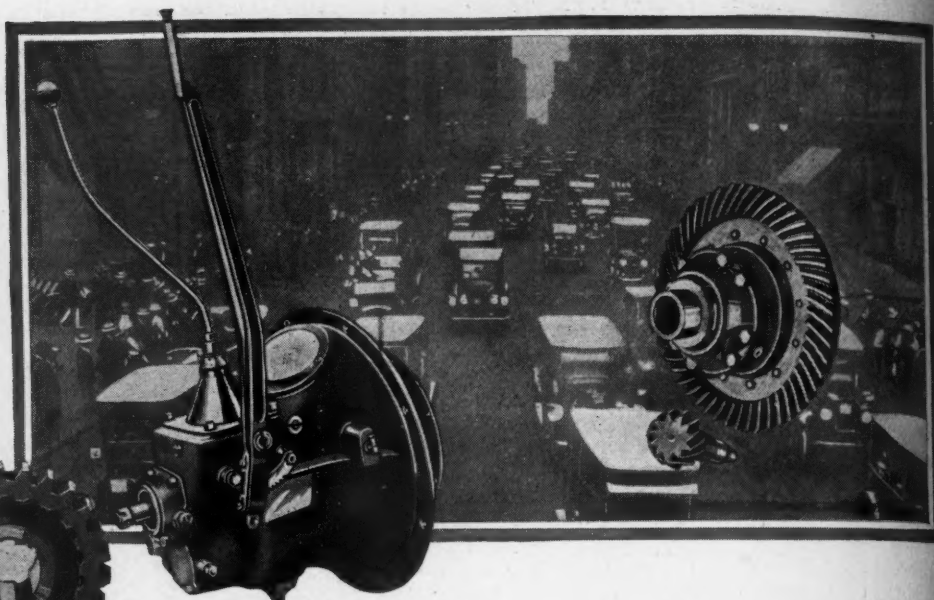
Albany Malleable Iron Co.	Albany, N. Y.
Albion Malleable Iron Co.	Albion, Mich.
American Malleables Co.	Lancaster, N. Y. and Orono, Mich.
Belle City Malleable Iron Co.	Racine, Wis.
Chen-Bell Co.	Milwaukee, Wis.
Chicago Malleable Castings Co.	West Pullman, Chicago, Ill.
Chisholm-Moore Mfg. Co.	Cleveland, O.
Columbus Malleable Iron Co.	Columbus, Ohio
Danville Malleable Iron Co.	Danville, Ill.
Dayton Malleable Iron Co.	Dayton, Ohio and Ironton, Ohio
Devlin Mfg. Co., Thomas	Philadelphia, Pa.
Eastern Malleable Iron Co.	Naugatuck, Conn.
Neugatuck Malleable Iron Works	Bridgeport, Conn.
Bridgeport Malleable Iron Works	Troy, N. Y.
Troy Malleable Iron Works	Wilmington, Del.
Wilmington Malleable Iron Works	New Britain, Conn.
Vulcan Iron Works	Erie, Pa.
Erie Malleable Iron Co.	West Alle, Wis.
Federal Malleable Co.	Pittsburgh, Pa.
Fort Pitt Malleable Iron Co.	Syracuse, N. Y.
Frazar & Jones Co.	Syracuse, N. Y.
Globe Malleable Iron & Steel Co.	Michigan City, Ind.
Haskell & Barker Car Co.	Chicago, Ill.
Illinois Malleable Iron Co.	Fairfield, Ia.
Iowa Malleable Iron Co.	Kalamazoo, Mich.
Kalamazoo Malleable Iron Co.	Marion, Ind.
Marion Malleable Iron Works	National Malleable Castings Co., Cleveland, Ohio, Chicago, Ill., Indianapolis, Ind., Toledo, Ohio, E. St. Louis, Ill.
National Malleable Castings Co.	Northern Malleable Iron Co.
Northern Malleable Iron Co.	Northwestern Malleable Iron Co.
Northwestern Malleable Iron Co.	Pittsburgh Malleable Iron Co.
Pittsburgh Malleable Iron Co.	Pressed Steel Car Co., (Western Steel Car & Fdy. Co.)
Pressed Steel Car Co., (Western Steel Car & Fdy. Co.)	Rhode Island Malleable Iron Works
Rhode Island Malleable Iron Works	Rockford Malleable Iron Works
Rockford Malleable Iron Works	Ross-Mechan Foundries
Ross-Mechan Foundries	St. Louis Malleable Casting Co.
St. Louis Malleable Casting Co.	Sowell Co.
Sowell Co.	T. H. Symington Co.
T. H. Symington Co.	Terr Haute Malleable & Mfg. Co.
Terr Haute Malleable & Mfg. Co.	Vermilion Malleable Iron Co.
Vermilion Malleable Iron Co.	Wagner Malleable Iron Co.
Wagner Malleable Iron Co.	Wisconsin Malleable Iron Co.
Wisconsin Malleable Iron Co.	Zanesville Malleable Co.
Zanesville Malleable Co.	

The American Malleable Castings Association

1900 Euclid Bldg., Cleveland, Ohio



Units-



That Have Earned Leadership

WHETHER or not your car or truck is selected by today's critical buyer depends upon the merit of its individual units, properly co-ordinated.

No units in your chassis are more important than the gears. Now—more than ever before—the quality that has earned leadership for Warner Gears is signally important to you.

The name Warner Gear represents the best in materials and workmanship, consequently the utmost in satisfaction. Today's demand will tolerate no less.

WARNER GEAR

COMPANY

MUNCIE INDIANA



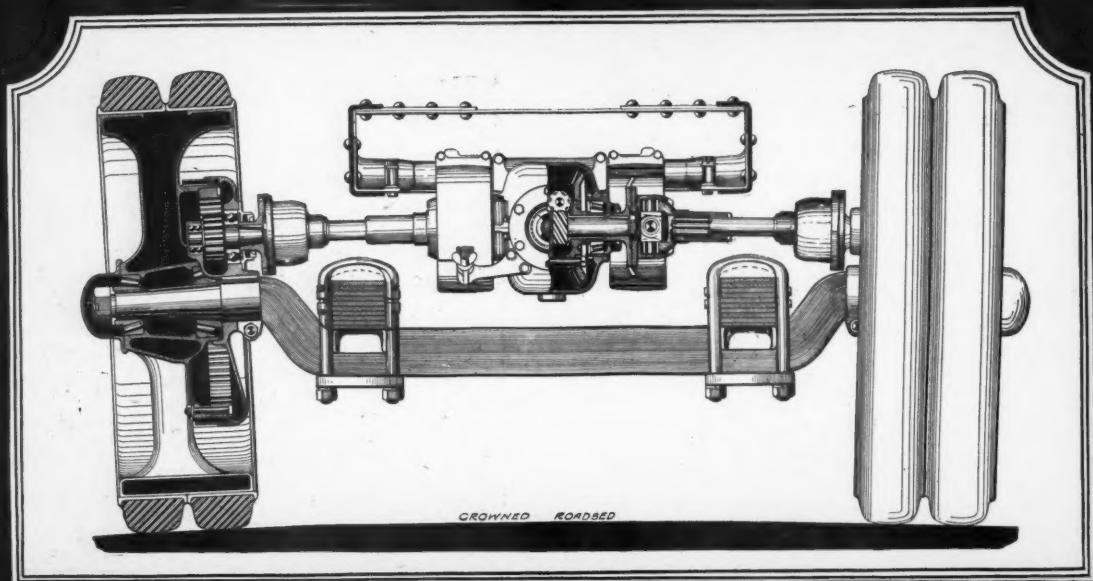


5 TON CHASSIS

\$5600

REGULAR EQUIPMENT

AUTOMATIC LOCKING DIFFERENTIAL
ELECTRIC STARTER || PATENTED SUSPENDED DRIVE
ELECTRIC LIGHTS || ENCLOSED STORM-PROOF CAB



INCREASES

TRACTION AND DRAWBAR PULL
SPEED AND POWER
FUEL ECONOMY AND EFFICIENCY
TIRE MILEAGE AND LONG LIFE
ACCESSIBILITY AND EASY RIDING
ROAD CLEARANCE
BRAKE EFFICIENCY
STRENGTH WITHOUT EXCESS WEIGHT

DECREASES

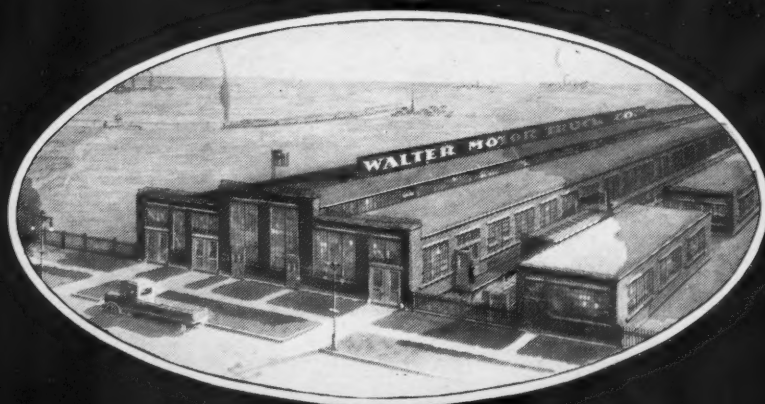
UNSPRUNG WEIGHT
REPAIR COSTS AND WEAR
GASOLINE CONSUMPTION
DRIVERS' WORK
LOST TIME
WORK OF REPLACEMENTS
FATIGUE OF DRIVER
ACCIDENTS

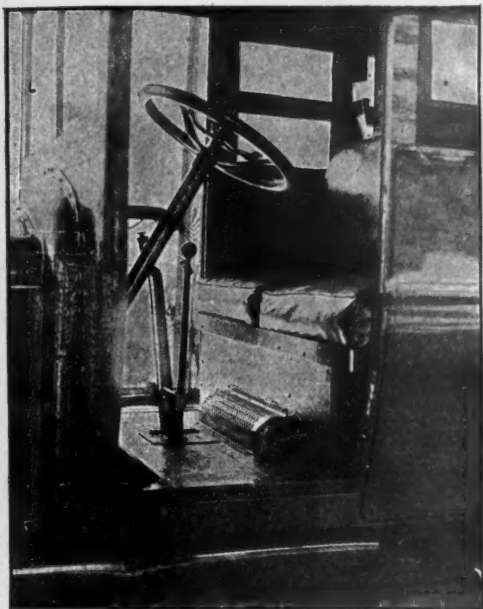
ELIMINATES

SLIPPING OF DRIVE WHEELS ACCIDENTS DUE TO SKIDDING
LOST TIME ON ROAD FROM SNOW, SLEET, MUD OR SAND
EXCESS WEIGHT

PERFECT LUBRICATION AND DIRT PROTECTION
SOLID FORGED ONE-PIECE LOAD AXLE

A PERMANENT SALES FRANCHISE IS AVAILABLE TO RESPONSIBLE DEALERS





Type "DWS" Heater in Truck Cab

*"The
Heat is
There*

*—Why
Not Use
It?"*



Type "DWS" Heater in Delivery Car

PERFECTION MOTOR CAR HEATERS

The sale of your trucks depends on their successful performance and economy of operation.

Every time this Fall and Winter a driver leaves his truck *to get warm* it increases operating costs and handicaps future truck sales.

Install Perfection Motor Car Heaters in your truck cabs and the drivers will always be comfortably warm regardless of weather conditions.

It will result in prompter delivery schedules and the good will of truck owners and drivers—an asset of no small value.

Perfection Motor Car Heaters are easily installed. Utilize exhaust gases. No operating expense—*"The Heat is There—Why Not Use It?"*

Our engineering department will co-operate in figuring out the most efficient and economical Perfection Heater installation for your trucks.

THE PERFECTION HEATER & MFG. CO.

6552 CARNEGIE AVENUE

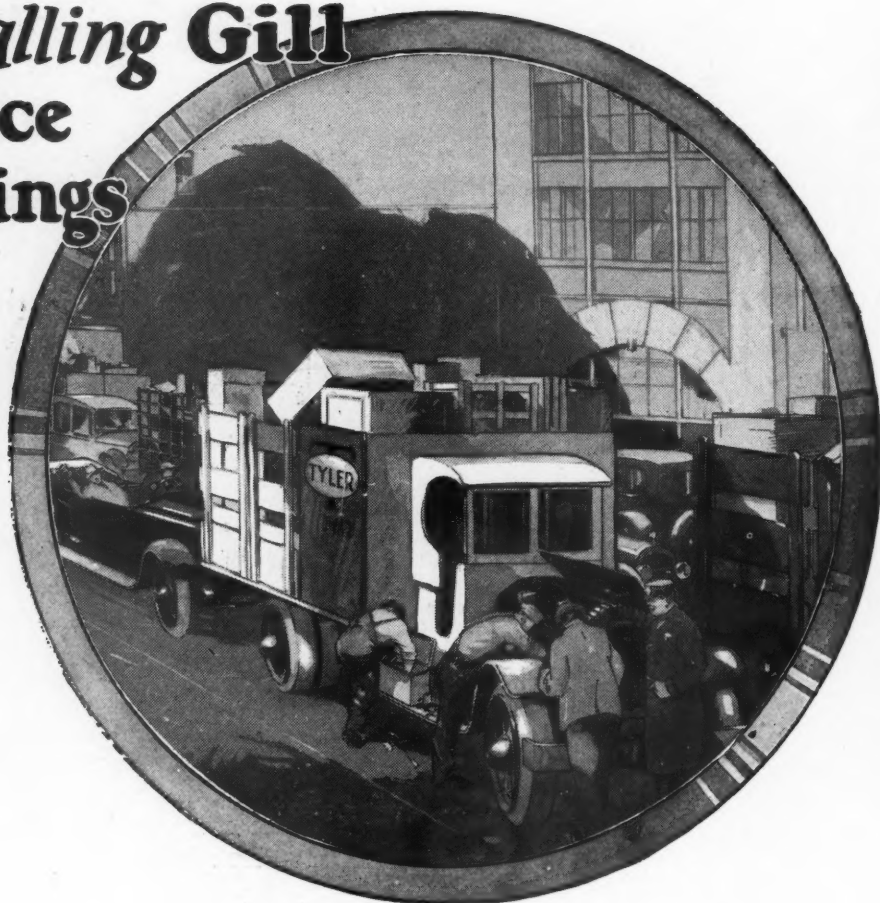
CLEVELAND, OHIO

Manufactured and Sold in Canada by RICHARDS-WILCOX CANADIAN COMPANY, LTD., London, Ontario

The Only Heaters (all models) Tested and Approved by Underwriters' Laboratories

Prevent This

by Installing Gill
One-Piece
Piston Rings



A TRANSPORTATION TIE-UP

Successful truck operators try to run their trucks on schedule the same as railroad trains. And when a truck is stalled in traffic as much money is lost, comparatively, as when a freight engine jumps the track.

In both instances delivery is delayed; and such delay always proves costly not only to the shipper but to the consignee. And in both instances not merely one load but *many* loads are affected.

The trucks of today are built to withstand the hardest kind of usage; but when there is excessive carbon accumulation; when the spark plugs become coated with a black, greasy gummy mess; when the valves become pitted; or when the engine misfires, even the best of them will falter, become weaker and weaker and finally quit.

The piston rings are probably at fault. But it is then too late—the damage has been done.



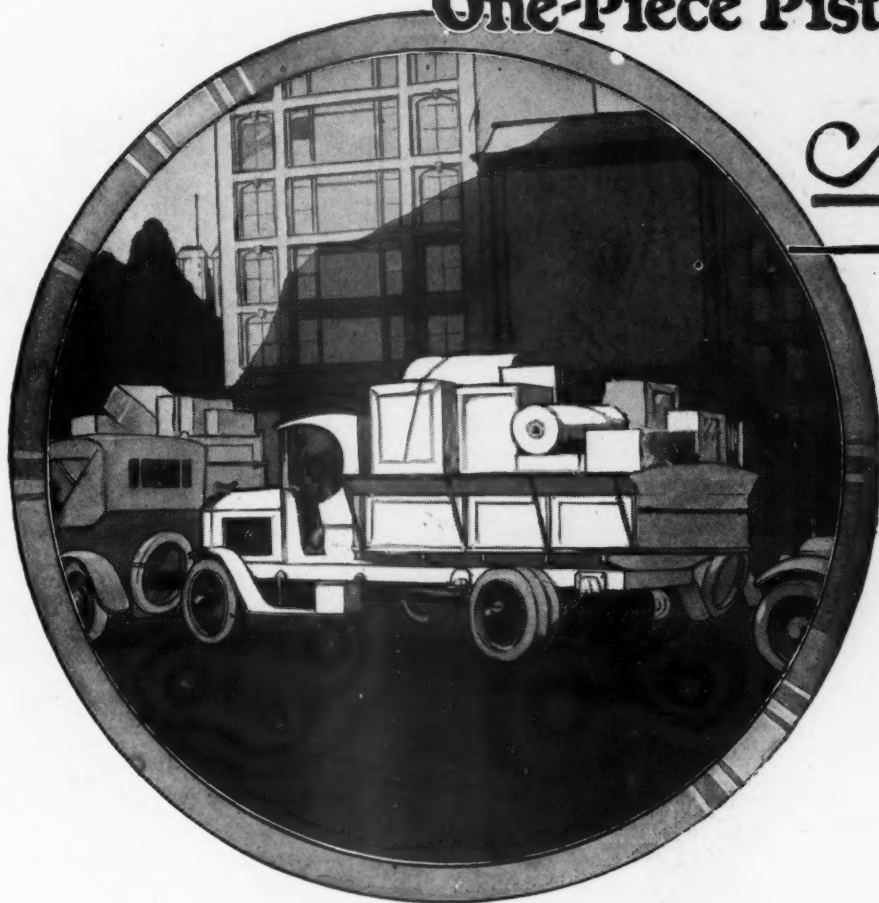
33 Branch Offices prepared to give practically 24-hour service to every jobber, supply store, dealer, garage, and repair shop in the country.

The Gill Manu- Chicago.

Canadian Manufacturer
BROWN ENGINEERING CORPORATION
Toronto, Ontario

Gill

One-Piece Piston Rings



*Assure
—this*

A CLEAR TRACK TO PROFIT

One way of being sure that a truck will live up to its schedule is to use Gill One-Piece Piston Rings in its engine.

For Gill Piston Rings fit so snugly against the cylinder walls that no oil can work past them into the firing chamber. They prevent carbon trouble; dirty spark plugs; pitted valves; misfiring—and other faults that tend to stall a truck.

And because of this same tight pressure against the cylinder walls Gill Rings hold every bit of gas in the combustion chamber where it is all compressed into power.

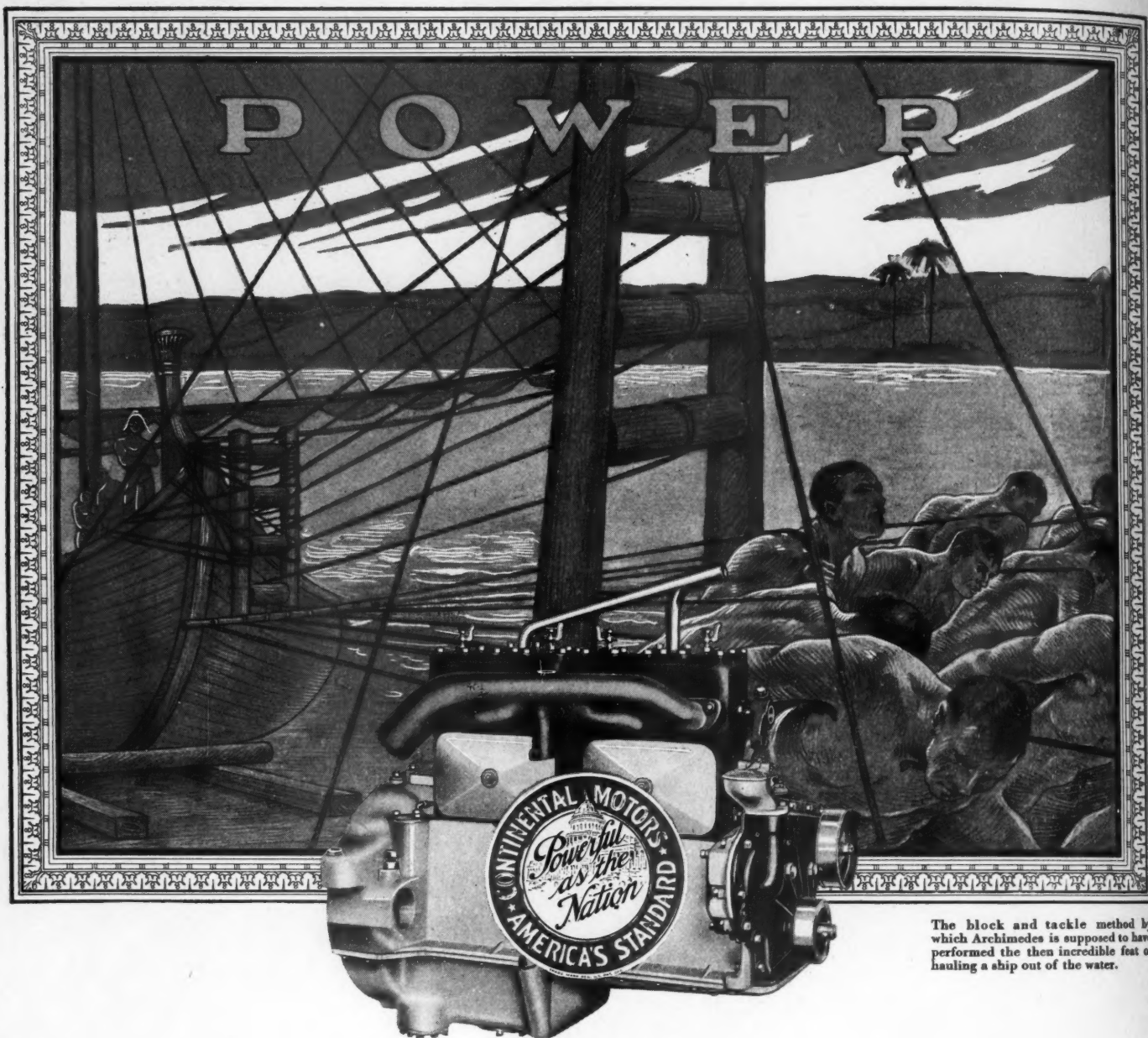
A truck in which Gill One-Piece Piston Rings have been installed makes a clean get-away on the road to profit. It doesn't jump the track and stop the wheels of industry. It drives right ahead with full power, and makes the delivery economically, promptly, and with the utmost satisfaction to consignee and shipper alike.

**Manufacturing Company
Illinois**

Sole Export Agents:
AUTOMOTIVE PRODUCTS CORPORATION
Woolworth Building, New York, N. Y.

Identify the Gill
One-Piece Piston Ring
by the joint, but do not
measure its merit by
the joint *alone*.





A consideration of the vast difference between the source of POWER of yesterday and the main springs of POWER that we tap today suggests the path that the motor manufacturer must follow. For the importance to all mankind of an efficient means of creating POWER is so manifest that it becomes the motor

producer's OBLIGATION to strive constantly for higher and still higher standards of performance. That is the policy that always has governed the Continental organization. It is the substance behind the curtain of good will that the world has accorded the Continental Red Seal.

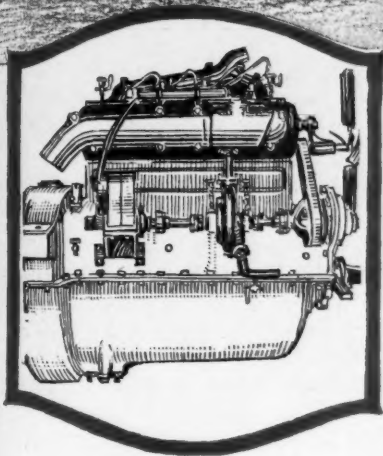
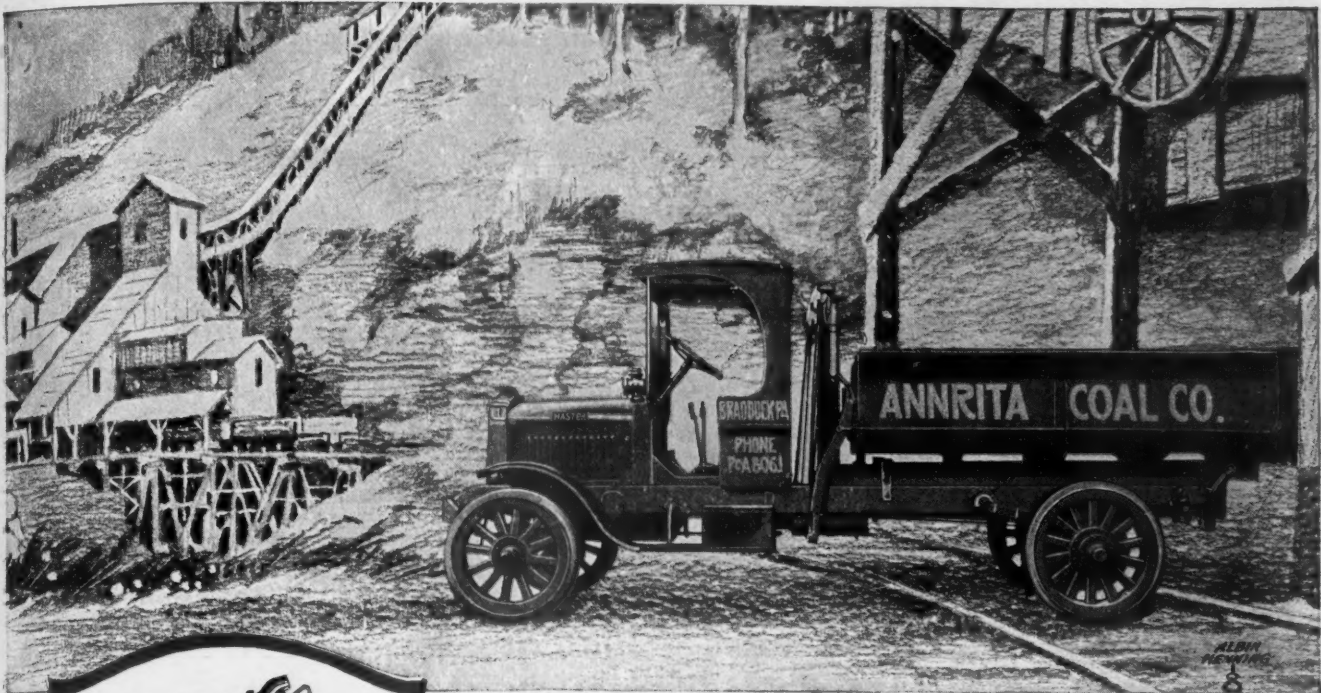
CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A.

Factories: Detroit and Muskegon

Continental Motors

Largest Exclusive Motor Manufacturers in the World



The Master Motor

is the heavy duty Buda — the world's finest Truck Motor. It is an oversize motor in every size Master — in oversized balance to every other part of Master construction. It is this "stronger than necessary" factor that brings the Master through every road emergency.

balanced oversize

Makes Master Trucks Masters
of the Coal Industry

LIKE a great steel coal car, the Master backs under the mine's tippel chute for its share in hauling the Nation's fuel. Like the great steel car, the Master is built for this heavy duty. From frame tip to frame tip every Master part is built with surplus strength so carefully poised that every twist and strain is met with certainty and ease.

For the Master is more than a combination of the world's best standard parts to make a truck that runs. It is a highly engineered combination of those parts to make a truck that endures.

Balanced oversize is more than a phrase. It is the dealer's and the owner's guarantee that the Master, one of the world's six greatest trucks, is an excellent truck investment.

14 Master Models—1½ to 6 Tons.

Good Dealers are Invited to Correspond.

MASTER TRUCKS, Inc.
Chicago, Illinois



MASTER

MASTER OF THE LOAD ON ANY ROAD

MULTIBESTOS BRAKE LINING

is factory equipment on
the following:

TRUCKS

Acason
Ace
Acme
All-Power
American La France
Armleder
Atco
Atterbury
Available
Beaver
Brockway
Buffalo
Capitol
Clydesdale
Collier
Concord
Conestoga
Dart
Day-Elder
Dearborn
Dependable
Detroit
Diamond T
Dodge Bros.
Dorris
Fageol
Federal
Ford
Gabriel
Garford
G-M-C
Giant
H. R. L.
Hahn
Hall
Hendrickson
Hewitt-Ludlow
Huffman
Independent
Jackson
Kalamazoo
Kelly-Springfield
Kissel Freighter
Kleiber
Lippard-Stewart
Luedinghaus
Maccar
Mack
Master
Maxwell
Menges
Menominee
Mutual
National
Netco
Norwalk
O-K
Oneida

Packard
Parker
Patriot
Pierce-Arrow
Rainier
Selden
Seneca
Service
Signal
Standard
Standard Oil Com-
pany of Ohio
Sterling
Studebaker
Sullivan
Super
Texan
Tiffin
Tower
Twin City
Velie
Watson
Wilcox Trux

TRACTORS

Avery
Bailor
Boring
Chase
Dauch
Emerson-
Brantingham
G-O
Hart-Parr
Illinois Super Drive
Indiana
Liberty
Massey-Harris
Moline-Universal
Monarch
National
Parrett
Samson
Waterloo Boy

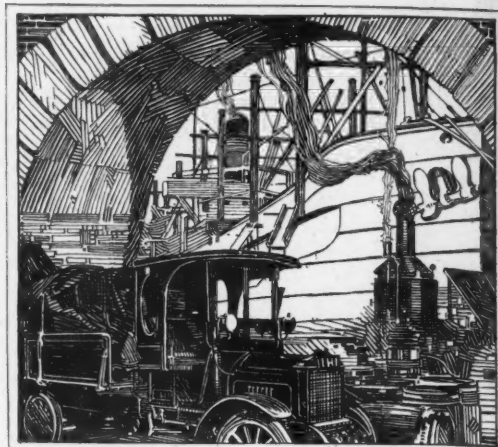
AXLES

Eaton
Peru
Spacke
Standard
Timken-Detroit
Torbensen
Vulcan
Wisconsin

MOTORCYCLES

Excelsior
Harley-Davidson

in addition to the above, Multibestos
Brake Lining is factory equipment on
the leading American passenger cars



You Can Bank on Their Word

WHOSE judgment do you value most in the matter of truck repairs or replacements? Assuredly—you have full confidence in the word of *truck engineers*.

Following the judgment of America's leading truck engineers, you can logically relined your brakes with only *one* make of brake lining. That lining is Multibestos. After untiring laboratory analyses; after repeated, grilling road tests, Multibestos brake lining has been made factory equipment on the leading American trucks (see list at left).

Would you know increased brake efficiency—greater safety—longer wear? Line your brakes with Multibestos. Learn for yourself why foremost engineers say: "Multibestos." Learn the stamina, the stand-up qualities of the Multibestos Interlocking Weave, sturdy wire strands and long-fibred asbestos.

Send for valuable free book,
"The Care of Your Brakes"

MULTIBESTOS COMPANY

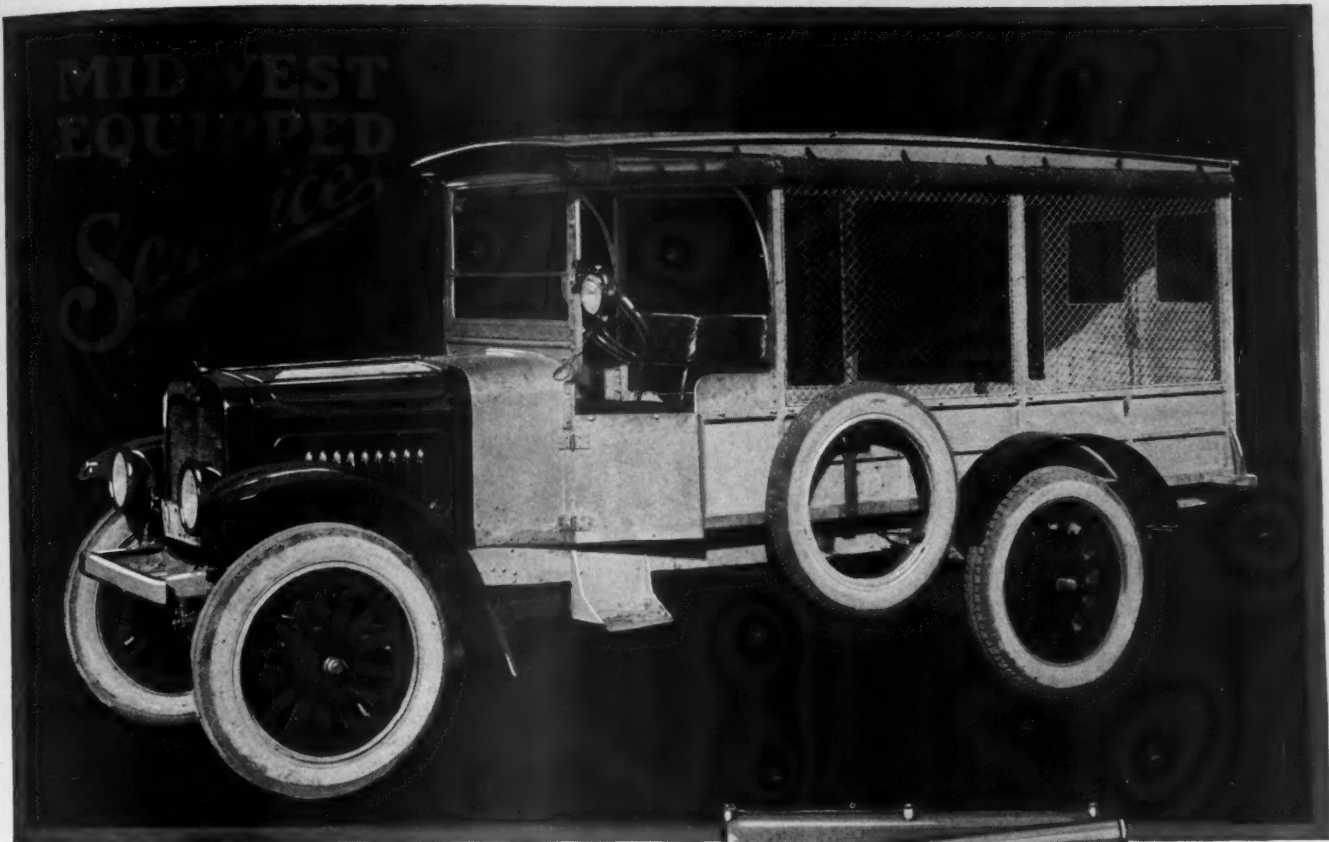
Walpole, Mass., U. S. A.

CHICAGO
1430 Michigan Ave.
SAN FRANCISCO
1035 Polk Street

KANSAS CITY
3104 Tracy Avenue
CHATTANOOGA
Eighth and Broad Sts.
NEW YORK, 105 W. 63rd Street
(West of Broadway)



MULTIBESTOS BRAKE LINING



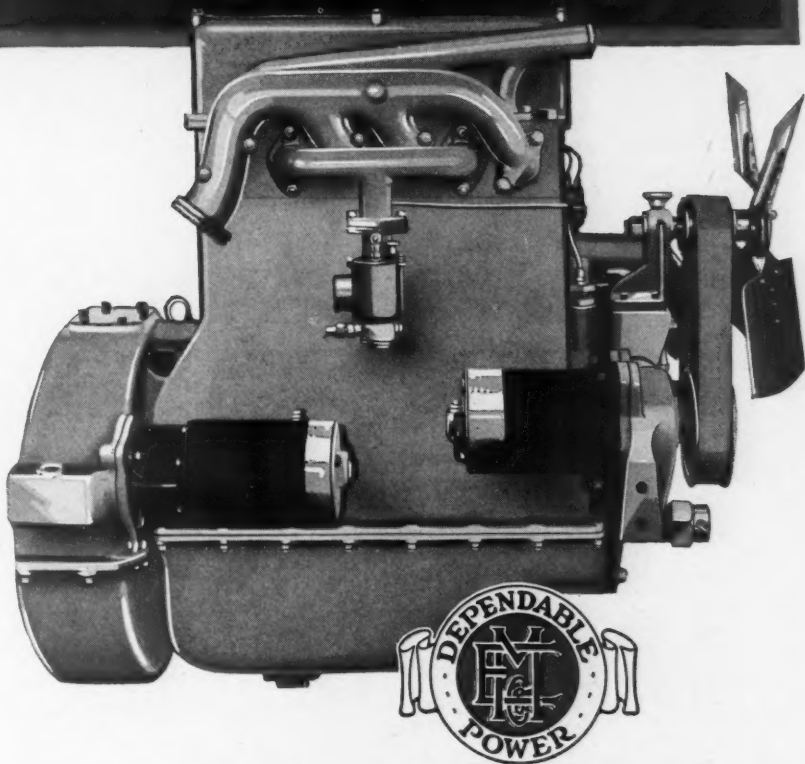
We illustrate above the new Service three-quarter to one ton pneumatic equipped truck. This is equipped with a Midwest $3\frac{5}{8} \times 5$ " heavy duty, high speed engine.

The Service Motor Truck Company adopted this engine only after the Midwest product was put through the most gruelling tests imaginable—tests extending over a long period of time.

These tests included comparisons, from a performance standpoint, with other engines available, and in some cases with engines of greater displacement.

Next month we will show you in detail the product of other manufacturers who have adopted the Midwest engine. These manufacturers have proved how *little* bore and stroke has to do with the performance which your customers expect.

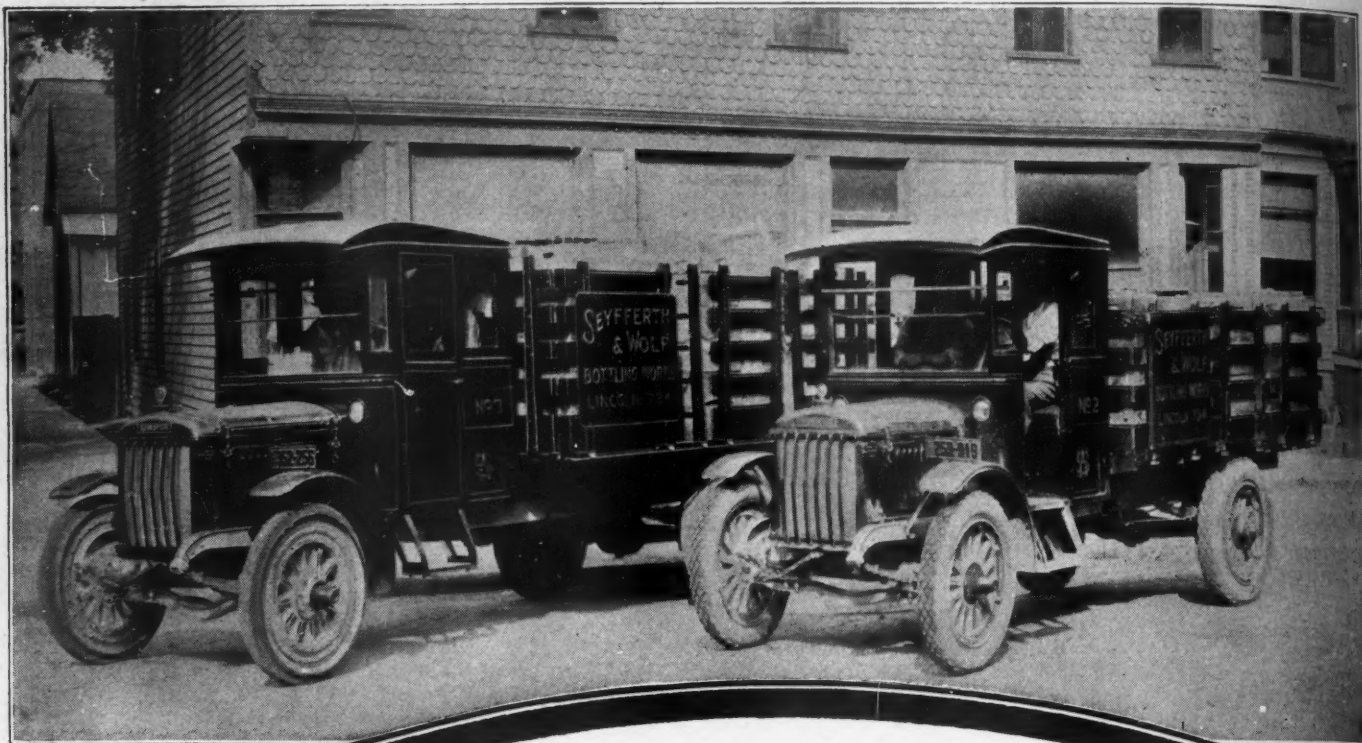
Midwest Engine Company
Indianapolis, U. S. A.



A full line of Midwest Truck and Tractor Engines will be exhibited at both the New York and Chicago National Automobile Shows in January

MIDWEST

TRUCK and TRACTOR ENGINE



Service That Means More Sales

"I have yet to see an instance where Transports operating in mixed fleets failed to get preference over all others when the owner needed additional trucks, and we had a case recently of four Transports replacing other makes," writes Mr. Chas. P. Smith, of the Smith Sales Company, Transport Distributor at Saginaw, Michigan.

Transport users the country over are meeting their expanding needs with more Transports. To the dealer this means more sales and larger profits—a satisfied clientele and pleasant business relations.

The Transport features that "take the eye" of the purchaser are but indications of the quality that goes into every inch of the truck. The Transport Automatic Oiling System, Hot Spot Manifold, Impulse Starter and Perfected Governing are some of the refinements that appeal at first. Steady performance, low cost hauling, and long life become increasingly evident with added use.

Write for our complete proposition.



TRANSPORT TRUCK COMPANY, Mount Pleasant, Michigan
Builders of "The Frictionless Truck"

Four models for 2000, 3000, 5000 and 7000 lb. service.
 Pneumatic tires optional at extra cost on all models.

TRANSPORT

INTERNAL GEAR DRIVE TRUCKS

MONARCH

*Limits the Speed
and the Expense*

The number of years of useful service you can reasonably expect from your truck depends on your "speed limit."

Excessive speed means excessive wear and tear and quick depreciation.

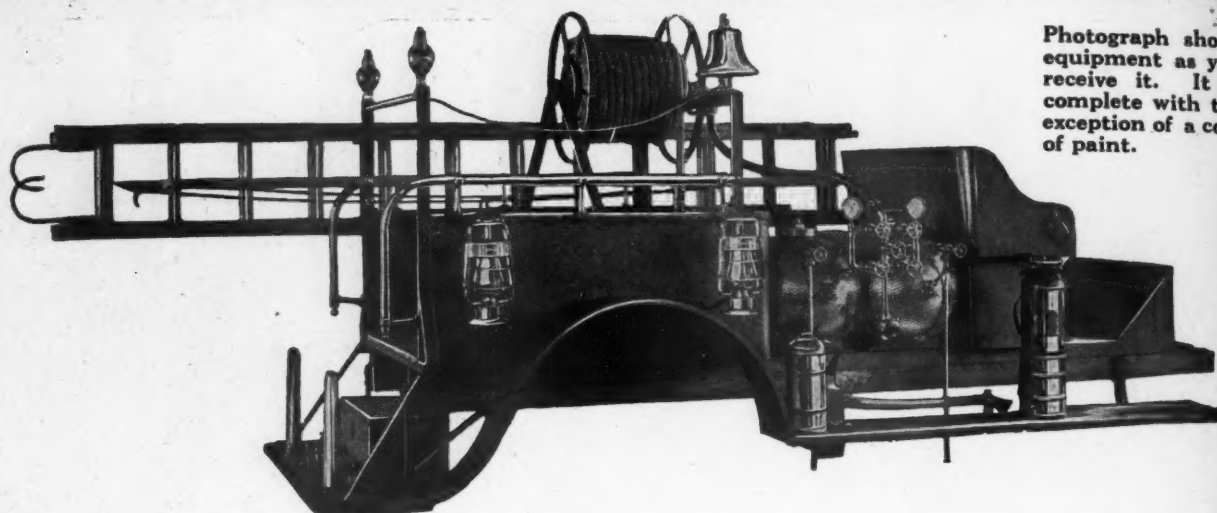
The Monarch Governor controls the speed accurately and automatically—and enables YOU to set the "speed limit."

Write for "Monarch Facts"

MONARCH GOVERNOR COMPANY
DETROIT MICHIGAN



FOR TRUCKS AND TRACTORS



Photograph shows equipment as you receive it. It is complete with the exception of a coat of paint.

MAKE A DOUBLE PROFIT ON THE TRUCK YOU NOW SELL!

CHILDS APPARATUS is now made to fit any chassis—that means we can supply you with apparatus complete, ready to go on any make of motor truck you sell, giving you a new opportunity to make two profits where there was only one before.

You get this sturdy, dependable equipment all complete, except a coat of paint; it hooks up to the chassis by tightening some bolts. Then you deliver the fire department truck complete.

Or, if you prefer, you can deliver the chassis to us and we will mount the equipment, paint the entire outfit and ship you the completed car.

Sell a fire truck to your town. A chance for a sale you never made before—a profit that you have been missing.

Makers of
Fire Apparatus
for the past
20 years

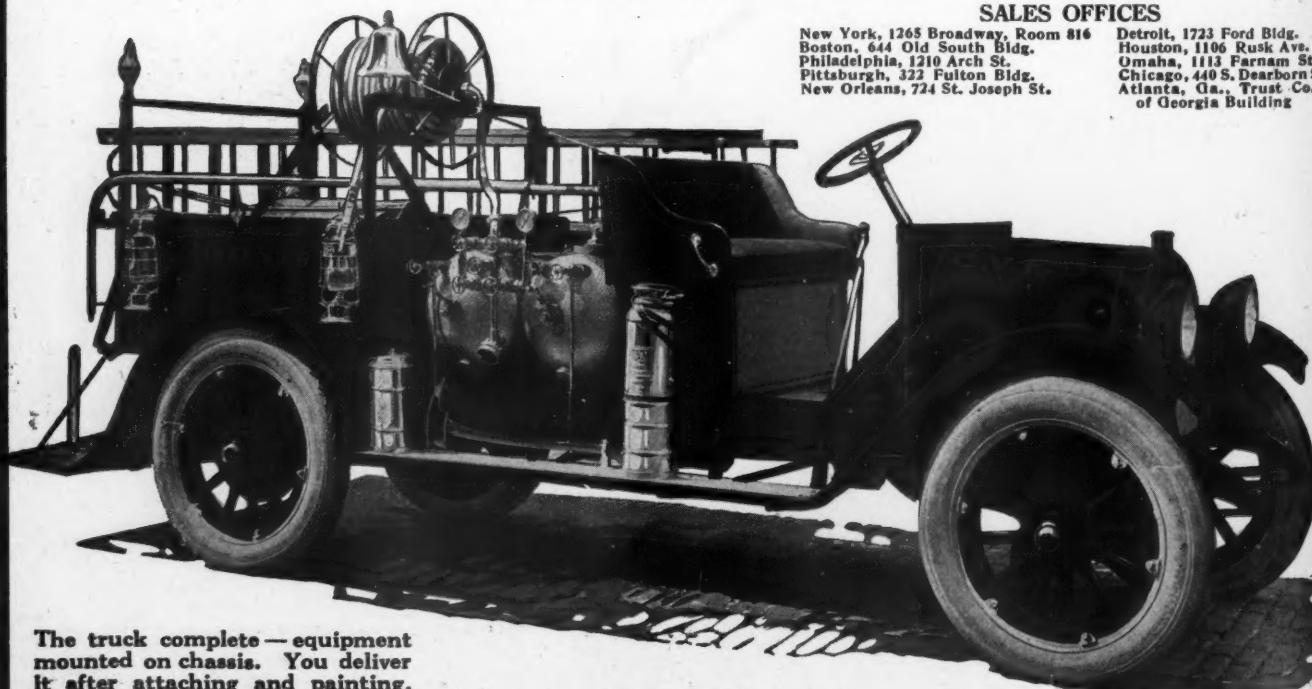


O.J. CHILDS COMPANY, UTICA, N. Y. FIRE APPARATUS

SALES OFFICES

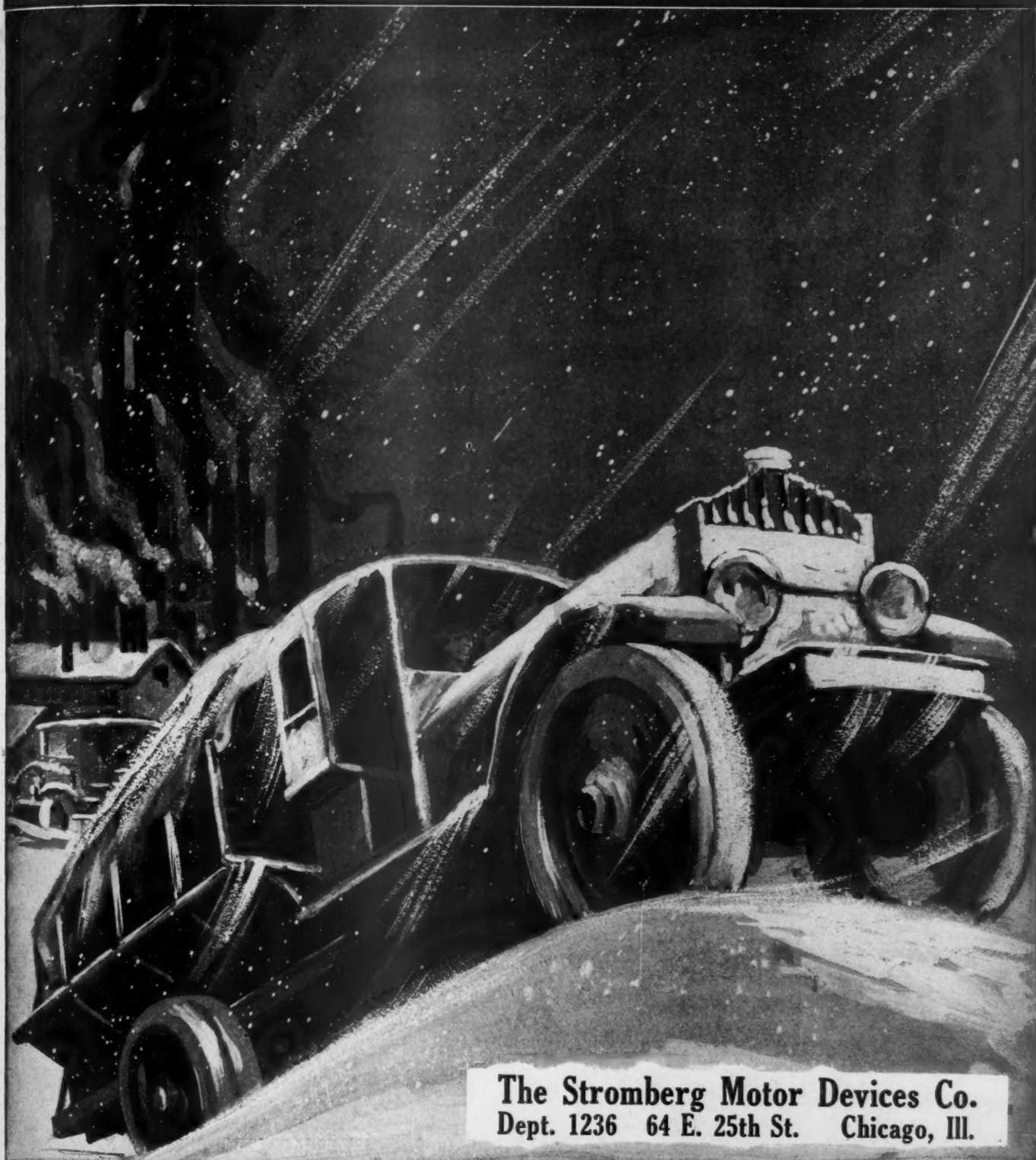
New York, 1265 Broadway, Room 816
Boston, 644 Old South Bldg.
Philadelphia, 1210 Arch St.
Pittsburgh, 322 Fulton Bldg.
New Orleans, 724 St. Joseph St.

Detroit, 1723 Ford Bldg.
Houston, 1106 Rusk Ave.
Omaha, 1113 Farnam St.
Chicago, 440 S. Dearborn St.
Atlanta, Ga., Trust Co.
of Georgia Building



The truck complete—equipment mounted on chassis. You deliver it after attaching and painting. And you make a nice profit.

Economy. Power. Reliability



The Stromberg Motor Devices Co.
Dept. 1236 64 E. 25th St. Chicago, Ill.

New STROMBERG Does it!

CARBURETOR

Resist abuse

BUMPTY-BUMP! BUMPTY-BUMP!!
And each bump delivers a blow equal to the weight of the truck and its load—multiplied by the speed at which the truck is traveling.

Fortunately the resiliency of WOOD Wheels absorbs within the wheels themselves the greater part of these otherwise dangerous blows, protecting the axle, differential, bearings, etc. And since these vital parts are so well protected, trucks go bumping along with mud hooks attached, disturbing only the spinal columns of careless drivers.

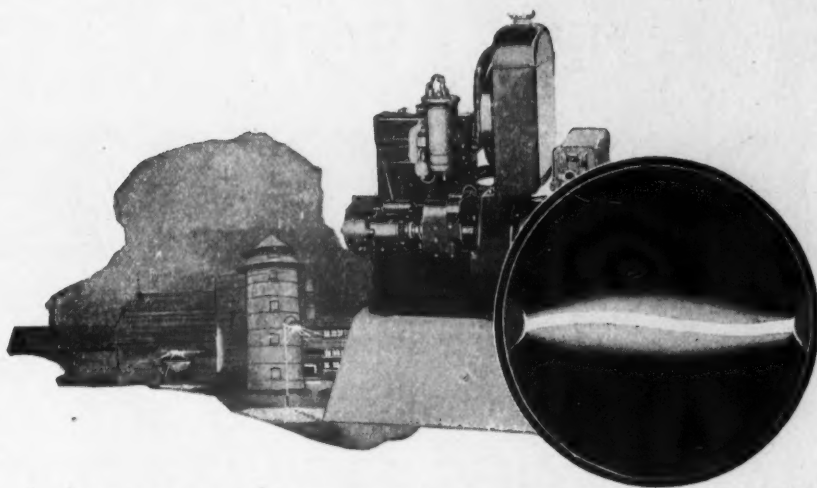
This is another reason why WOOD Wheels have been used for years and will continue to be used on the world's best trucks.

AUTOMOTIVE WOOD WHEEL
MANUFACTURERS' ASSOCIATION
105 West Monroe Street Chicago, Ill.

NOTE THE
WOOD WHEELS
EVERYWHERE

WOOD WHEELS

for MOTOR
VEHICLES



The white hot spark you want when you want it—and every time!

You can't take your farm lighting and power outfit to a service station



26. Why do all the big trucks use "mags"?

Because "mags" are absolutely dependable.

27. Practically all tractors?

Same reason.

28. 98% of all fire engines?

Same reason.

29. Practically every aeroplane?

Same reason.

30. All the big gasoline railway locomotives?

Same reason.

(To be continued)

No, Sir! If it is in trouble it means several days out of commission. That means money lost. So it has to keep out of trouble—it has to be built absolutely dependable.

That is why the best outfits have "mags"—the simplest, the most economical, the absolutely dependable form of ignition.

No matter whether you have a truck, tractor or passenger car, ignition, is the *heart* of the engine.

You want white hot "juice" all-day-every-day, up or down hill, high or low speed, Winter or Summer.

You want ignition that *won't* lie down.

You want an Eisemann "mag."

See the Eisemann Exhibits:
Automobile Shows

New York, January 8th to 15th
Spaces D131-2-3-4

Chicago, January 29th to February 5th
Spaces 119 to 126, inclusive

National Tractor Show

Columbus, February 7th to 12th
Spaces 404 to 407, inclusive

THE EISEMANN MAGNETO CORPORATION

32 Thirty-Third Street, Brooklyn, N. Y.

Detroit: 85 Willis Avenue, W.

Chicago: 1469 So. Michigan Avenue



NEW 1 TON

ARMLEDER

Motor Trucks

MARVELOUS FLEXIBILITY

New Spring Invention, Combined With Other Unusual Features of Design and Special High-Grade Materials, Makes Possible New Flexibility Which Revolutionizes Motor Truck Performance

Almost incredible—yet true.

Strength, speed, flexibility, ease of operation and riding are combined as they never have been before by an inspiration of automotive engineering genius.

This marvelous truck is the logical development of eleven years of persistent striving

for ultimate perfection in motor truck construction by Armleder engineers.

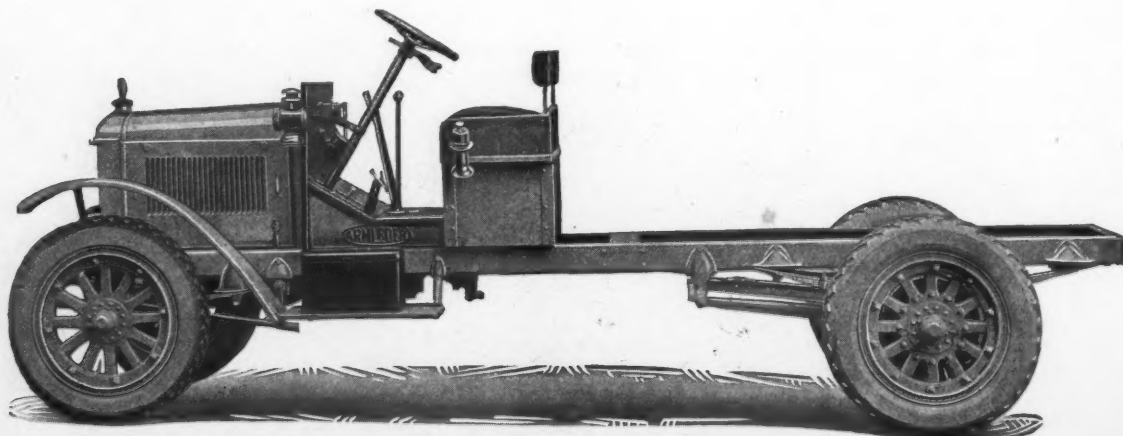
You will never be able to realize the truth of these statements, nor even to imagine all that this wonderful new motor truck is until you have actually seen it and ridden on it.

\$1,000 REWARD IF YOU CAN SHOW US HOW TO IMPROVE IT

Every invention which made this remarkable truck possible is so simple as to be recognized at once as the logical construction. You will wonder why they were not thought of before, even by ourselves.

So perfect is this motor truck that we will pay \$1,000 in cash to any person who can prove to us an improvement in material or construction that will make it 1% better in quality or economy of operation.

THE O. ARMLEDER CO.



THEY RIDE LIKE TOURING CARS

AND ARE BUILT FOR HEAVY DUTY

DEMAND WILL BE PHENOMENAL

Some of our big dealers are clamoring for our entire output for months. Never has anything excited so much sales interest.

Production is being increased to keep up with sales, so that all Armleder dealers will be supplied with their requirements.

This is the opportunity of a lifetime for dealers.

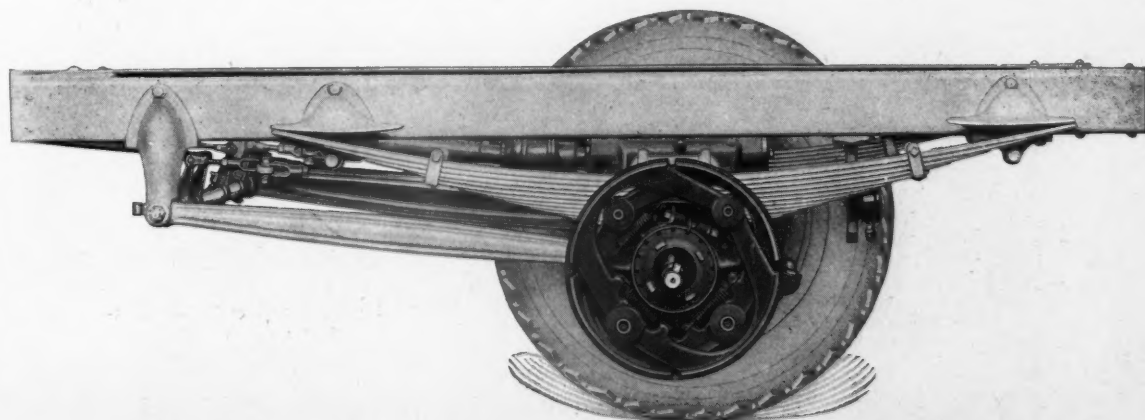
Act now before your competitor does.

THE WONDERFUL SPRING CONSTRUCTION

THE SPRINGS are only one of the many patented features used exclusively in Armleder Motor Trucks. There are no shackles nor shackle bolts; about 48 wearing parts are eliminated; each leaf is made of triple heat-treated Vanadium steel; pads between springs and axles are machined, set in lead, air and water tight; held by strong U-bar clips, they will not loosen; they are 63½ inches long and shorten 18 inches under load; without load weight rests on tips of springs; with load weight rests 9 inches from the ends of the springs; they ride like touring cars; reduce gasoline and upkeep costs; increase life of tires and truck.

1, 2½ and 3½ Ton Models. Worm Drive

Cincinnati, Ohio, U. S. A.



The LYCOMING MOTOR

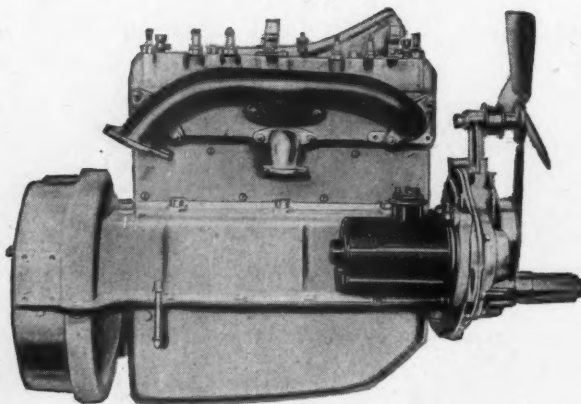


The Commercial Car Manufacturer is in a Fortunate Position

Both automobiles and commercial vehicles are economic necessities in an increasing measure but the present period, with its need for controlling and reducing transportation costs, gives the commercial car manufacturer an opportunity to take advantage of the more careful buying that has succeeded the extravagance which preceded.

The economies of the motor with which his car is equipped, its strength, simplicity and quality are now features of greater importance to the ultimate user.

The unvarying standard of every Lycoming Motor, its reliability under conditions of unusual service, and the certainty of scheduled deliveries are the manufacturer's assurance of establishing and maintaining the favorable attitude of his customers and prospects.



**Lycoming Motors
Corporation**

Williamsport, Pa.

peak loads

Ace trucks traveled on their own power from the factory to the Atlantic Coast during the snow storms of last winter, and beat the freight car shortage by delivering their loads in all weathers over all grades.

Ace trucks pulled out other trucks, took fire engines and hook and ladder wagons to fires through almost impossible drifts and made an unmatched winter transportation record.

Ace trucks in 1½ and 2½ ton capacity are ready for immediate delivery. We make in our own plant any style of wood body you may require.

PRICES, CHASSIS ONLY

1½ Ton...\$2750.00 2½ Ton...\$3450.00

A full range of special equipment, extra

Automotive Products Corp. Export Dept.
WOOLWORTH BLDG., NEW YORK CITY

Cable Address, Autoprodeo, New York

Ace
MOTOR  TRUCKS
**IMMEDIATE
DELIVERY**



The AMERICAN MOTOR TRUCK COMPANY
NEWARK OHIO.

Martin-Parry

Commercial Bodies



Martin-Parry Body No. 618--a Vestibule Panel Body for the Ford Truck Chassis

Keep Up Your Winter Sales With Martin-Parry Bodies

Because it includes sizes for all Ford Chassis and styles for every season and service, the Martin-Parry line of commercial bodies enables dealers to do good business the year 'round.

The high-grade panel body No. 618 shown above is an especially good seller during the winter season. Yet it is an "all season" model because the vestibule front is readily adjusted to open or closed style. It is well-built, attractively finished and will ideally meet the needs of many merchants who are now in the market for new motor delivery equipment.

Body No. 229A, is a popular model, widely used for passenger and baggage service by hotels, winter resorts and many other lines.

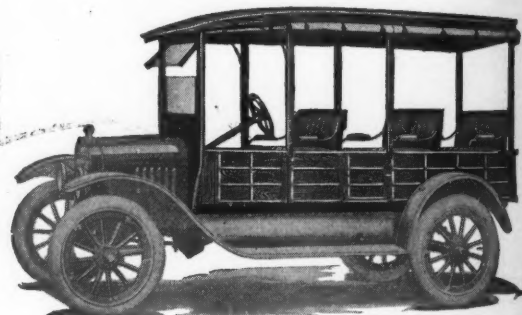
Built of selected hard wood and finished in natural wood colors, this body comfortably seats six persons. By removing the two rear seats, it is quickly adapted to carrying baggage or freight.

Speed up winter sales and increase profits with these bodies. You will find them in good demand. We can make immediate shipments on orders placed at once.

Martin-Parry Corporation

The Largest Commercial Body Builders in the World

York, Penna. —Main Offices and Factories— Indianapolis



*Martin-Parry Body No. 229, A.
for the Ford Model "T" Chassis.*

DISTRIBUTING POINTS

Atlanta, Ga.	Martin-Parry Corp.
Boston	Martin-Parry Corp.
Buffalo	Martin-Parry Corp.
Chicago	Martin-Parry Corp.
Denver	Auto Equipment Co.
Detroit	School-Gracey Body Co.
Duluth, Minn.	Foster Motor Co.
El Paso	Tri State Access. Corp.
Kansas City	Henry Seested
Memphis	Universal Motor Car Co.
Millwaukee	Wis. Body & Sales Co.
Minneapolis	Northwest Body Co.
New York	Martin-Parry Corp.
Oklahoma City	H. N. Knight Sup. Co.
Pittsburgh	Pittsburgh Com. Body Co.
Richmond, Va.	Benj. T. Crump Co.
St. Louis	Bailey Auto Body Sales Co.
San Francisco	Flynn & Collins
Seattle	Commercial Body Co.
Spokane, Wash.	Universal Auto Co.



Cooling Systems embodying Long Spiral Tubing were adopted as standard for War Trucks—they are equal, as well, to all peace time requirements

THE system of automotive radiation that is recognized as *paramount—supreme*—in its vast field; the system that eliminates the hazards, the disappointments, the failures, by placing at the command of the producer, the skilled, experienced, *specialized services of engineers* who study the requirements of every motor for every purpose. A record of 18 years of unequalled accomplishments is assurance of valuable co-operation.

No engine can be more efficient than its cooling system.

Look to it then that your motor be permitted to realize its maximum of efficiency through the aid of a cooling system engineered to suit its requirements.

LONG MANUFACTURING CO., DETROIT, MICHIGAN

Pioneer Makers of Cooling Systems for Gasoline Engines

LONG
COOLING SYSTEMS

The Recognized Standard for Tractor, Trucks and Motor Cars.

Watch the Rowe in Action

Stand aside and critically watch a Rowe Truck in action, with or without a load. For smooth action and reserve power, it has no peer. The Rowe runs as smoothly as a limousine, without swaying or side motion. All the drive is forward, with no loss of power.

Even when the Rowe is empty it does not rattle and jolt as do many other makes, as depreciation is closely guarded against and forestalled by the Rowe design.

The Rowe line includes four models—1 to 1½-2-3-4-5 to 6 ton capacities, which enable dealers to approach any class of truck prospects with the certainty that they can prescribe a Rowe model to meet every trucking need.

A Wisconsin Motor, Zenith Carburetor, Bosch Magneto, Sheldon Axle, Sheldon Springs, Ross Steering Gear and Simplex Governor, are a few of its splendid parts which we mention to convey an idea of its excellent construction.

All Rowe models are alike in design and construction, differing only in weight-carrying parts. This enables Rowe dealers to equip truck users with several models of various capacities and to assure them that the cost of maintenance and expense will be lowered considerably because of this uniformity.

A few Rowe dealerships happen to be open now.

If you are interested, write us. We will tell you the Rowe story—how it was the Pioneer Worm Drive Truck of America and all that it stands for today. But to really appreciate the Rowe it is necessary to see it work, to take the wheel yourself and ride in it.

Rowe Motor Mfg. Co.
Lancaster Pennsylvania

THE SATURDAY EVENING POST



Here is the Real Test

When the loaded truck is on a sloping road and the wheels are skidding, then most of the weight is thrown to one side.

This is the supreme test of axle strength. The side-strain brings pressure to bear on a part of the axle about five times greater than the normal down-pressure of the load.

Sheldon Axles are built to resist these side strains. The bearings are widely spread—the principle upon which locomotive and freight car axles are built—and the wheels are fixed rigidly to the revolving axles.

Sheldon Axles are made for all kinds of work for any truck from one-half to five ton capacity.

When you buy a truck, look for the torpedo-shaped hub caps and double anchor trade mark.

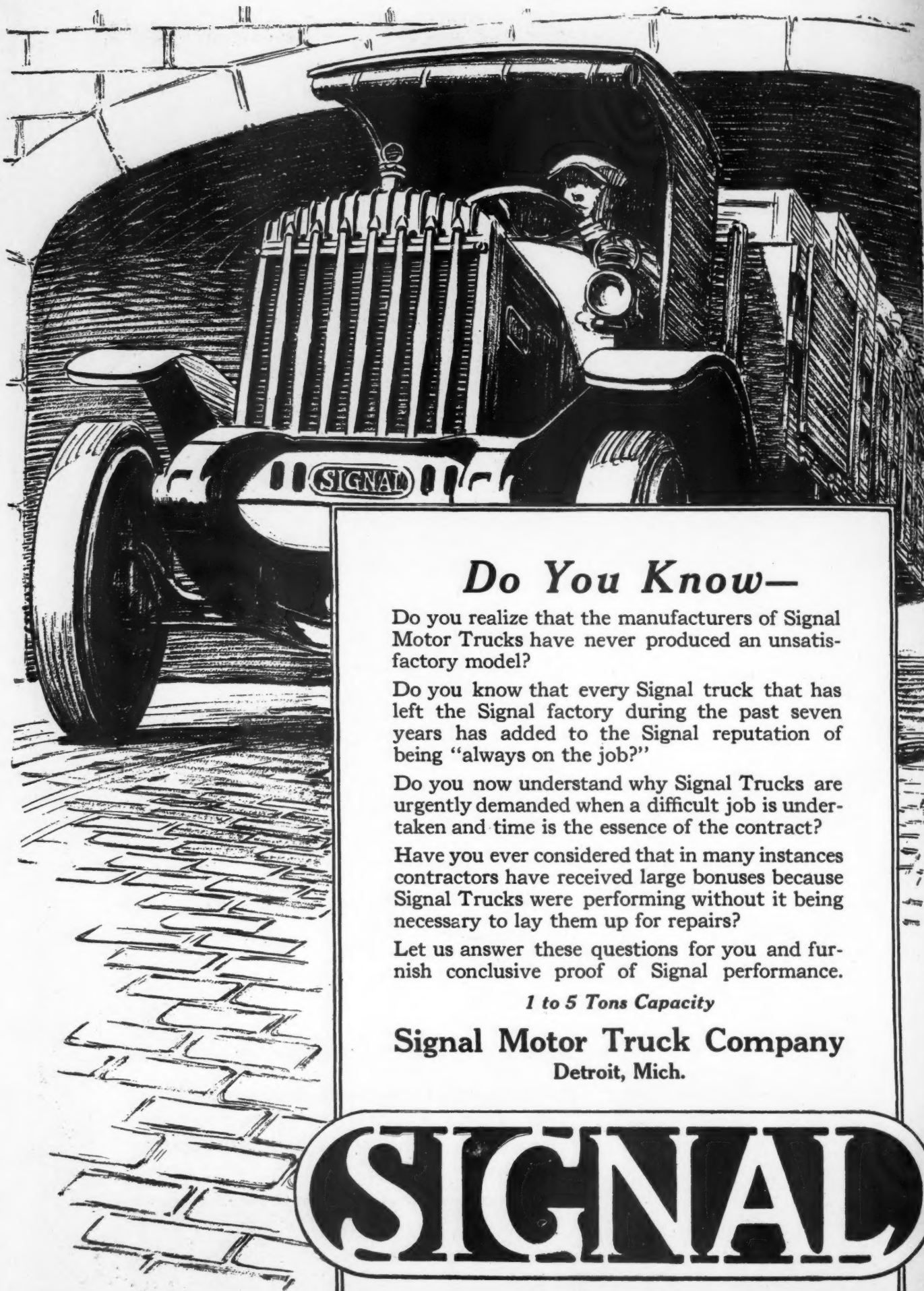
SHELDON AXLE AND SPRING COMPANY, Wilkes-Barre, Pa.

Manufacturers of Sheldon Axles for Motor Trucks and Sheldon Springs for Trucks and Automobiles

Sheldon Axle

FOR MOTOR TRUCKS

IT is natural for truck buyers to look for the axle that they've learned the most about. And you know what axle that is.



Do You Know—

Do you realize that the manufacturers of Signal Motor Trucks have never produced an unsatisfactory model?

Do you know that every Signal truck that has left the Signal factory during the past seven years has added to the Signal reputation of being "always on the job?"

Do you now understand why Signal Trucks are urgently demanded when a difficult job is undertaken and time is the essence of the contract?

Have you ever considered that in many instances contractors have received large bonuses because Signal Trucks were performing without it being necessary to lay them up for repairs?

Let us answer these questions for you and furnish conclusive proof of Signal performance.

1 to 5 Tons Capacity

Signal Motor Truck Company
Detroit, Mich.

SIGNAL

Factors of Safety

In Spring Making *In Spring Buying*



Here's Where the Spring Gets Its Curve—

The flat spring plate, glowing red, is placed between the forming dies of this machine. Then—the jaws close, bending the leaf to the proper shape. Next, the leaf is plunged into an oil bath which cools and hardens it.

This forming machine perfectly shapes and quenches eight leaves during each revolution.

A large number of these machines, designed and developed to a point of perfection by our engineering staff, is part of the modern spring machinery equipment which has led automobile manufacturers to place confidence in us as their source of spring supply.

We Offer These

Factors of Safety

Consider Them as They Apply To Your Production

- 16 years of experience.
- Abundant active and reserve capital.
- Unusual organization and mechanical equipment.
- Reserve machines, spacious storage and extensive reserves of steel.
- Broad and liberal sales policies.

These assure you a steady, un-failing supply of motor car springs.



Detroit Steel Products Company, 2250 East Grand Boulevard, Detroit, U. S. A.



Make Comparisons

Turn over to "The Motor Truck Specifications" in The Commercial Car Journal, and see for yourself how much larger and better Gary trucks are than other trucks of the same rated capacity — and after you have learned what Gary users know, please note that Gary prices are *below the average* of over forty different makes of heavy-duty worm drive trucks.

We have some open territory.

We can make immediate deliveries.

Our proposition to dealers is the most liberal to be had anywhere.

Write or Wire Today

THE GARY MOTOR TRUCK CO., 2301 West 9th Ave., Gary, Ind.

1, 1½, 2½, 3½ and 5 ton. Special Motor Bus. Special Farm Wagon. Special Tractors.



Experience—Not Theory

Years of experience in truck repairing and truck building dictated the choice of the extra heavy radius rods, the heavy hot rolled frame—the many features that are back of King-Zeitler Truck performance.

Experience, not theory, was responsible for the selection of Timken-Detroit Axles.

You'll find Timken-Detroit Axles under 60 well known and well built American motor trucks.

Abbott-
Downing
Acason
Ace
Acme
*Ahrens-Fox
Armleder
Atterbury
Available
Brinton
Brockway
Chicago
Clydesdale
Collier
Dart
*Denby
Diamond T

Dorris
Equitable
Facto
Fageol
Federal
G. M. C.
Gary
Hahn
Hendrickson
King-Zeitler
Kissel
Kleiber
Koehler
Lewis-Hall
Maccar

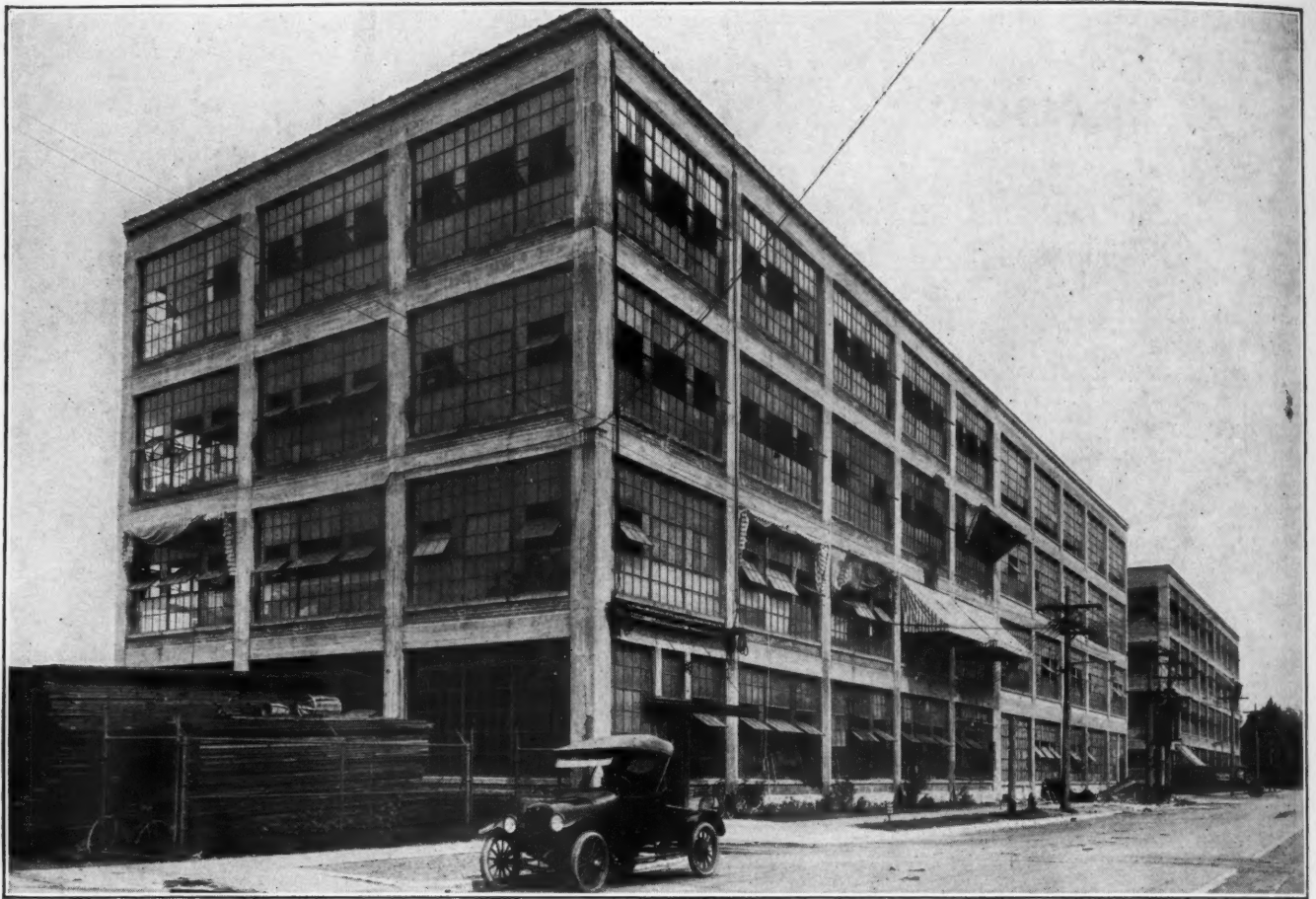
Master
Menominee
Michigan
Hearse
Minneapolis
Moreland
National
Nelson &
LeMoon
New England
Oneida
Paige-Detroit
Parker
Rainier
Sandow
*Seagrave
Selden

Service
Signal
Southern
Standard
Sterling
Sullivan
Tegetmeier &
Riepe
Tower
Walker-
Johnson
Ward
LaFrance
White Hickory
Witt-Will
Wilson
*Front Axles

THE TIMKEN-DETROIT AXLE COMPANY
Detroit, Michigan

TIMKEN DETROIT AXLES



**TRANSMISSIONS**

THE demand for Fuller Transmissions made it necessary to add another four-story unit, which has now been completed. This entire plant is devoted to manufacturing transmissions, clutches and controls exclusively.

FULLER & SONS MFG. CO.

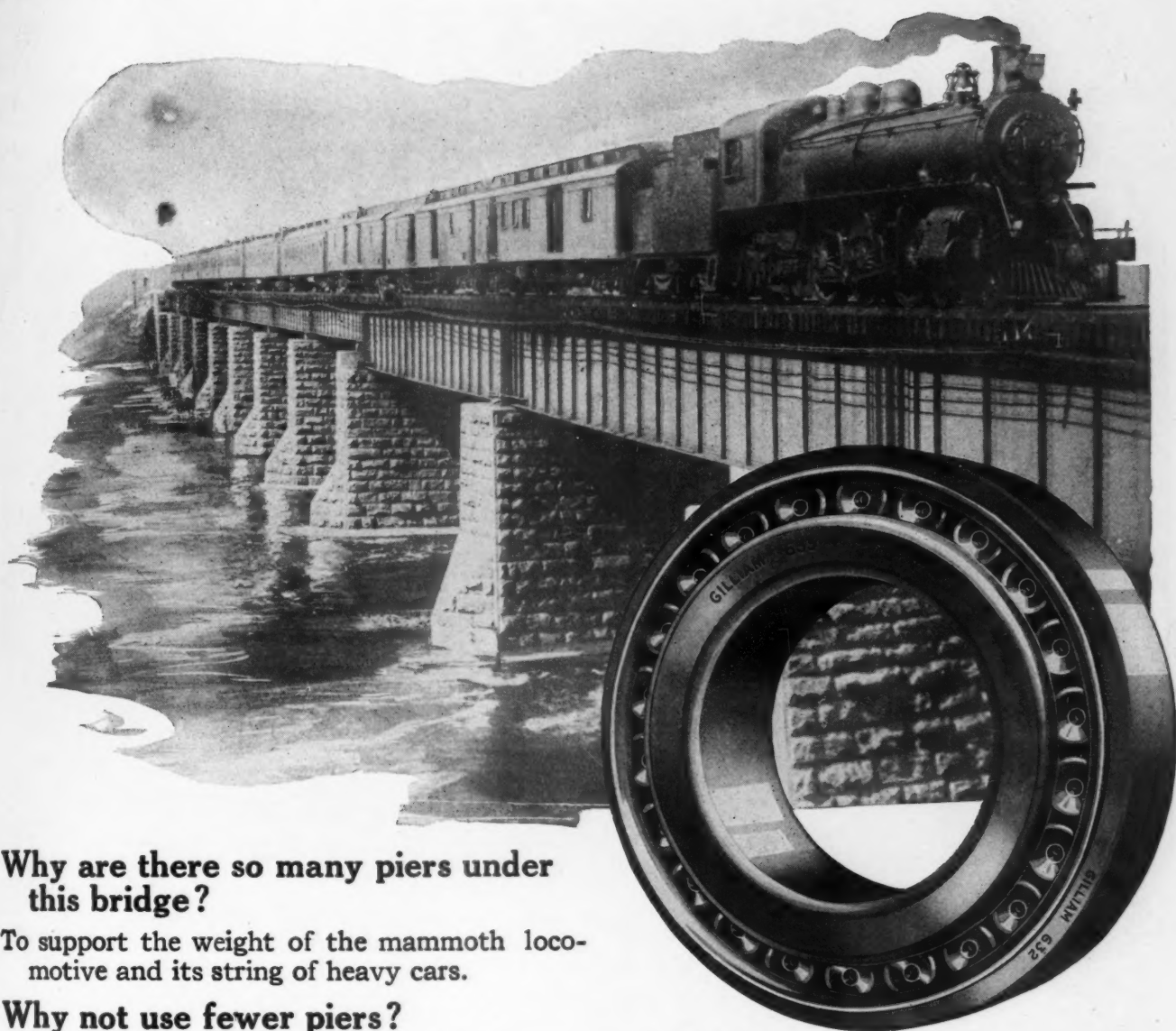
KALAMAZOO, MICHIGAN

Detroit

New York

San Francisco

London



Why are there so many piers under this bridge?

To support the weight of the mammoth locomotive and its string of heavy cars.

Why not use fewer piers?

Because the factors of strength and endurance would be too low.

For the same reason GILLIAM TAPERED ROLLER BEARINGS are designed with the maximum number of long rollers of the largest possible diameter, because they, too, carry heavy loads and must have great strength and endurance.

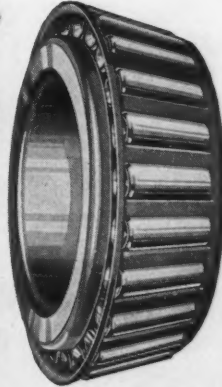
**"They Last Longer
Because They Are Stronger"**

THE GILLIAM MFG. CO.

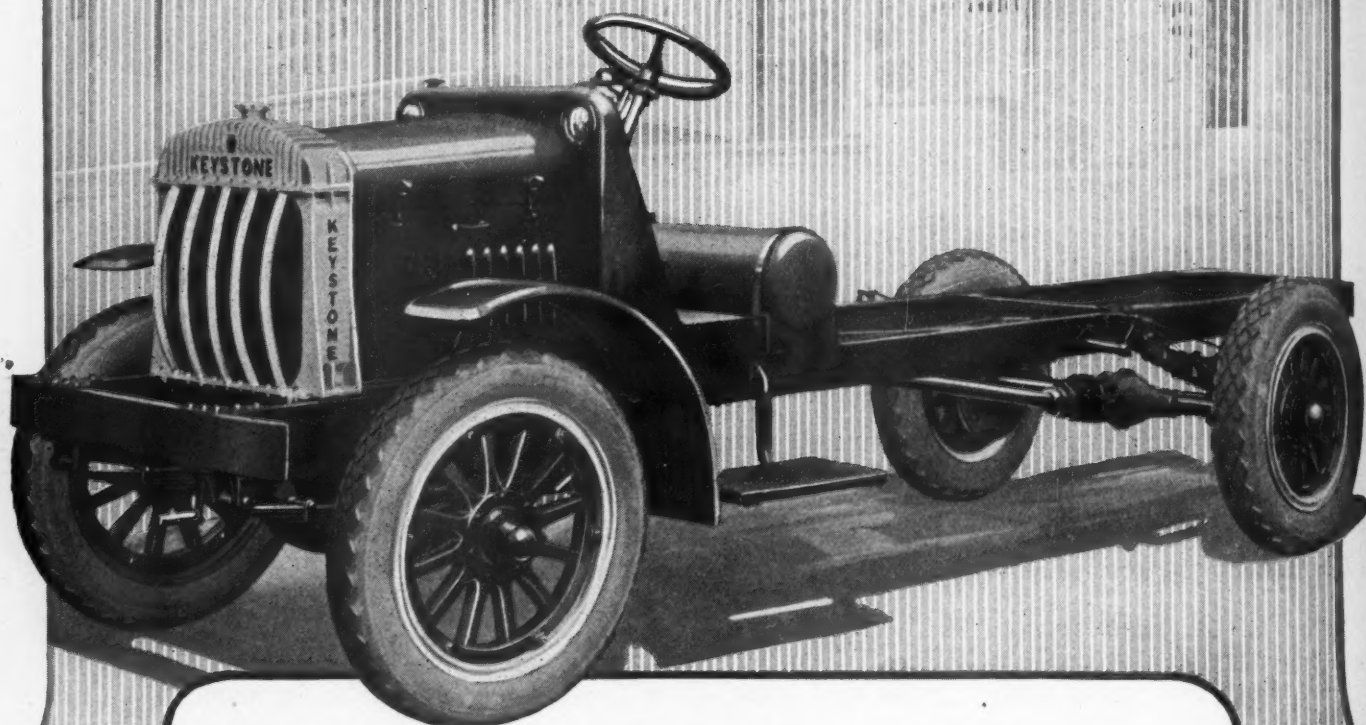
CANTON, OHIO

DETROIT OFFICE: 4829 WOODWARD AVENUE

GILLIAM
TAPERED ROLLER
Bearings



KEYSTONE TRUCKS



**The Demand for This Fair Priced and Dependable Truck Increases.
Enlarged Factory Space Enables Us to Keep Pace With the Demand.**

Immediate Action Suggested for a Few Exclusive Franchise Territories Still Open

2 Ton Model:

**All Pneumatics: Front 34 x 5,
Rear 38 x 7..... \$2550**

**All Solids: Front 34 x 4,
Rear 36 x 6..... \$2350**

F. O. B. Factory

Motor: Buda 4 cylinder, 3 1/4 x 5 1/2, 30 H. P. Ignition: Berling Magneto, high-tension, water-proof. Drive: Spicer. Carburetor: Zenith Automatic. Clutch and Transmission: Fuller. Rear Axle: Russel Internal Gear. Equipment Includes: Pierce Governor, Whistle, Power Driven Tire Pump, Impulse Starter, etc.

On request we'll send detailed specifications

With Every Keystone Truck and Franchise Goes Factory, Sales and Service Co-operation. We Stand Back of Every Truck We Sell

Keystone Motor Truck Corporation
OAKS, MONTGOMERY CO. PENNSYLVANIA



QUALITY DROP FORGINGS

**FOR
AUTOMOTIVE
CONSTRUCTION**

SPECIALISTS IN THE MANUFACTURE OF

I-BEAM FRONT AXLE FORGINGS

WESTERN DROP FORGE CO.

MARION, INDIANA

HIGHWAY TRAILER

EDGERTON
WISCONSIN

The Largest Trailer Plant in the World

Sell the Trailer These Great Firms Choose

*Many Bankers Now Stipulate the Use
of Trailers in Financing Truck Sales*

These Are a Few Large Operators of Highway Trailers

The U. S. Army The U. S. Navy
Baldwin Locomotive Works
Philadelphia
American Telephone & Telegraph Company
The Cadillac Motor Car Company
Detroit
The National Tea Company
"Piggly-Wiggly" Chain Stores
Headquarters, Chicago
The Timroth Motor Express Company
Chicago
Southwestern Telephone & Telegraph Co.
St. Louis, Mo.
Towars Creamery Co.
Detroit
Chicago Telephone Company
The T. M. E. R. & L. Interurban Express Co.
Milwaukee, Minn.
The Fisher Body Co.
Detroit
The Rex Manufacturing Co.
Connersville, Ind.
The Public Service Company
Chicago
The Timken-Detroit Axle Co.
Detroit
Lindeteves-Stokvis Co.
Amsterdam, Holland
Dutch East Indies
Semarang-Sourabaya-Batavia
Tegal-Djakarta-Bandoeng
Medan-Makassar
T. E. M. A.
Buenos Aires-Shanghai

Highway Trailers have established a dominant place in the scheme of modern transportation.

Nothing could emphasize their importance more strongly than the recognition of their economy and efficiency by hundreds of concerns, whose business extends not only throughout America, but in every part of the world.

And now many bankers have endorsed the utility and earning power of the trailer, by stipulating the use of trailers as a condition to financing truck sales.

Every truck in your territory is a prospect for Highway Trailers. The time seems near when every truck sold, will sell one or more trailers.

The quality and construction of Highway Trailers is proved by the fact that it was the only trailer accepted without design change by the U. S. Government, which operates more than \$1,000,000 worth.

You can sell the advantages that made Highway Trailers the choice of all these. It is your opportunity to build a big profitable business. Write for details.

Note Price Advantage of Highway Trailers

1½ Ton \$785	4 Ton \$1325
2½ Ton \$995	6 Ton \$1695



*The Timroth Motor Express Co., of Chicago
Operates a Large Fleet of Highway Trailers in Con-
nection With 150 Trucks. "Each of My Trailers Earns
\$25 a Day," Says Mr. Timroth.*

A five-ton blow on the rear axle

What happens to the universal joint in a heavily loaded truck

THE hardest strain in starting a loaded truck comes at the rear axle.

Five tons of dead weight to be moved—every time the truck is started. This means a five-ton blow at the rear axle.

Metal universal joints transmit the full force of this terrific blow throughout the whole rear axle assembly. Metal joints soon wear loose—causing rattle and backlash. This is the danger signal for trouble to follow.

Cushioning the shocks that rack a car

To absorb these five-ton blows—to protect a car or truck from this constant wear and tear—the Thermoid-Hardy Universal Joint has been constructed. It is built of flexible fabric discs which cushion the damaging shocks. It transmits a smooth, even flow of power to the rear axle.

Free from lubrication troubles

There are no metal-to-metal wearing surfaces in the Thermoid-Hardy Universal Joint. No lubrication required, no working time lost.

In passenger cars as well as in heavy-duty trucks, the Thermoid-Hardy Joint has frequently run 60,000 miles without replacement or adjustment. More than fifty manufacturers are now using the Thermoid-Hardy Joint as standard equipment.

Enormous strength of the flexible fabric joint

The patented fanwise construction of the flexible fabric discs gives the

Thermoid-Hardy Universal Joint its extraordinary strength. This unique construction, shown below, is the only way in which uniform strength and elasticity can be obtained.

Your customers will be quick to appreciate the advantages of the Thermoid-Hardy Joint on their trucks.

Send for advance proofs of the national advertising campaign and our new book, "Universal Joints—Their Use and Misuse." The book will give you in detail the construction of the Thermoid-Hardy Joint, records of performance, opinions of leading engineers and manufacturers who have adopted it.

THERMOID RUBBER COMPANY

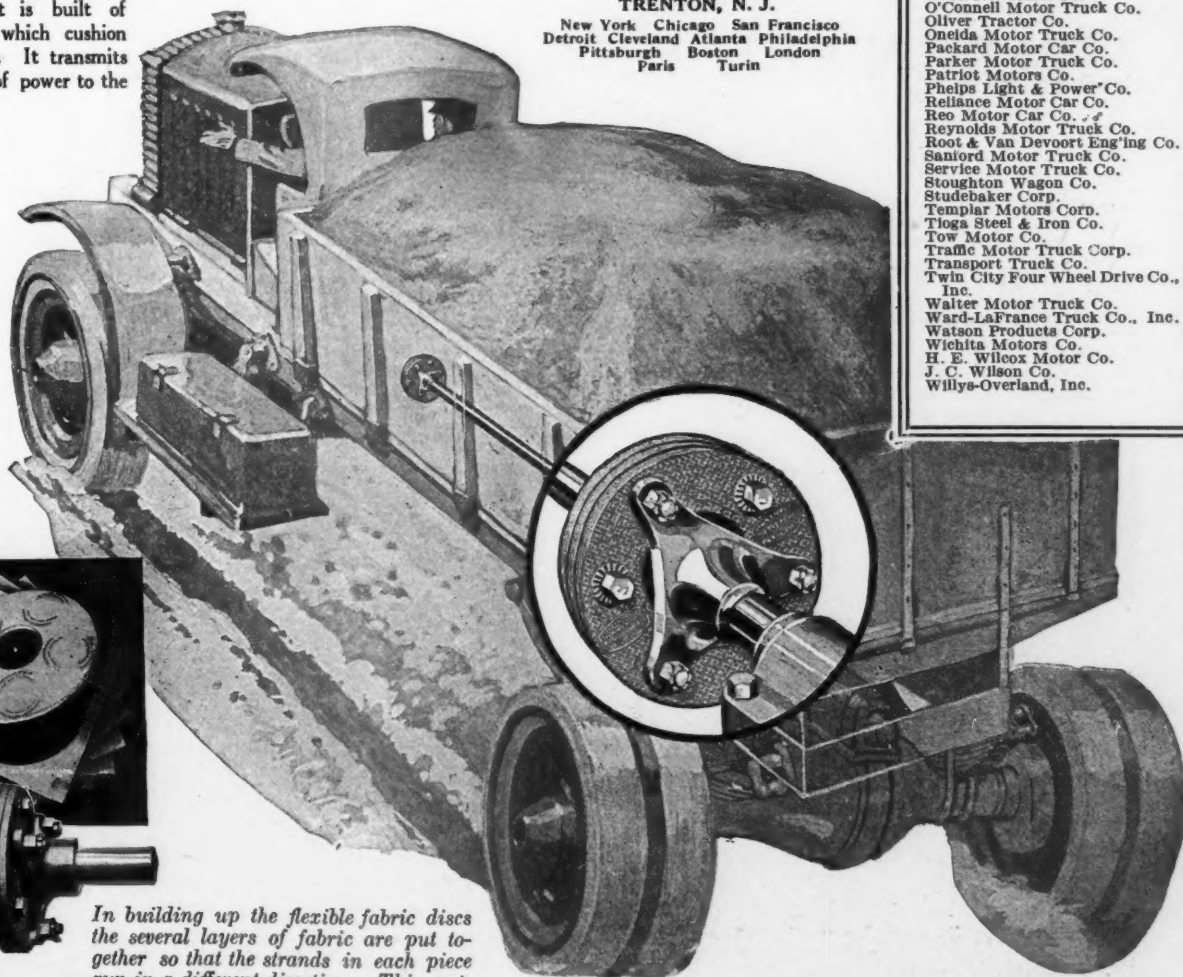
Sole American Manufacturers

Factory and Offices:
TRENTON, N. J.

New York Chicago San Francisco
Detroit Cleveland Atlanta Philadelphia
Pittsburgh Boston London
Paris Turin

LIST OF USERS

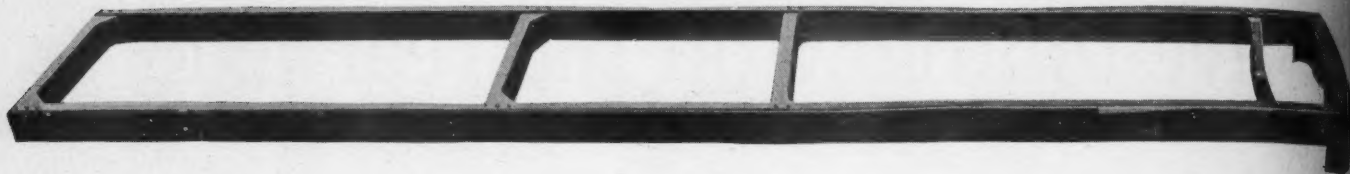
American-British Mfg. Co.
Anderson Motor Co.
The Autocar Co.
Available Truck Co.
Barley Motor Car Co. (Roamer)
Briscoe Motor Corp.
Capitol Motor Corp.
Crow-Ekhart Motor Co.
Jas. Cunningham Son & Co.
Dart Truck & Tractor Corp.
Diamond T Motor Car Co.
Doane Motor Truck Co.
Fagel Motor Car Co.
H. H. Franklin Mfg. Co.
Garford Motor Truck Co.
Gramm-Bernstein Motor Truck Co.
Hendrickson Motor Truck Co.
Holt Mfg. Co.
Indiana Motor Truck Co.
International Harvester Co. of America, Inc.
International Motor Co.
Ky. Wagon Mfg. Co. (Dixie Flyer)
King Motor Car Co.
King Zeitler Co.
Larrabee-Deyo Motor Truck Co., Inc.
Lexington Motor Co.
Locomobile Co. of America
Maxwell Motor Corp.
Menominee Motor Truck Co.
Mercer Motors Co.
Moreland Motor Truck Co.
McFarlan Motor Co.
Nelson & LeMoon
E. A. Nelson Motor Car Co.
Nelson Motor Truck Co.
D. A. Newcomer Co.
O'Connell Motor Truck Co.
Oliver Tractor Co.
Oneida Motor Truck Co.
Packard Motor Car Co.
Parker Motor Truck Co.
Patriot Motors Co.
Phelps Light & Power Co.
Reliance Motor Car Co.
Reo Motor Car Co.
Reynolds Motor Truck Co.
Root & Van Devoort Eng'g Co.
Sanford Motor Truck Co.
Service Motor Truck Co.
Stoughton Wagon Co.
Studebaker Corp.
Templar Motors Corp.
Toga Steel & Iron Co.
Tow Motor Co.
Traffic Motor Truck Corp.
Transport Truck Co.
Twin City Four Wheel Drive Co., Inc.
Walter Motor Truck Co.
Ward-LaFrance Truck Co., Inc.
Watson Products Corp.
Wichita Motors Co.
H. E. Wilcox Motor Co.
J. C. Wilson Co.
Willys-Overland, Inc.



In building up the flexible fabric discs the several layers of fabric are put together so that the strands in each piece run in a different direction. This patented fanwise construction provides the greatest tensile strength. In a laboratory test made recently at Purdue University the drive shaft, itself, was twisted at a total stress of 21,700 inch pounds without injury to the universal joint.

Makers of "Thermoid Hydraulic Compressed Brake Lining" and "Thermoid Crolide Compound Tires"

**THERMOID-HARDY
UNIVERSAL JOINT**
Fanwise construction for strength



Two plants with a combined floor space of over 100,000 square feet for the manufacture of

FRAMES

In our Sharon and Ellwood City plants we have ample facilities for handling your quality frame requirements. Complete heat-treating and other equipment, a well united organization, quality materials, insure you absolutely satisfactory results. *Send us your specifications.*

SHARON PRESSED STEEL CO., Sharon, Pa.

Josiah Kirby, President

Board of Directors

E. E. Slick, formerly Vice-President of the Midvale Steel Co.
 L. L. Knox, Vice-President of the Blaw-Knox Company
 C. K. Strausburg, formerly General Manager of the Standard Tank Car Company
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The Meaning of this Symbol

THIS SYMBOL in a manufacturer's advertisement indicates that he has placed complete buying information about his product in the current issue of the standard reference book of the trade—the **CHILTON AUTOMOBILE DIRECTORY**.

THIS SYMBOL serves you because, by consulting the current issue of the **CHILTON AUTOMOBILE DIRECTORY**, you instantly obtain the information you would otherwise get by writing for catalogs.



You have often read an advertisement in a trade journal that interested you to the point of buying, and yet you did not buy because you were too busy to write the advertiser for additional information.

THIS SYMBOL will be used by manufacturers in their advertisements to inform you that complete buying information about their products is contained in the current issue of the **CHILTON AUTOMOBILE DIRECTORY**.

When this Symbol appears in the advertisement of any product that you desire to buy, you know it refers you to the **CHILTON AUTOMOBILE DIRECTORY**, where you will find catalog information.

THIS SYMBOL makes purchasing easy. It tells you where you can secure detailed buying data and eliminates tedious correspondence.

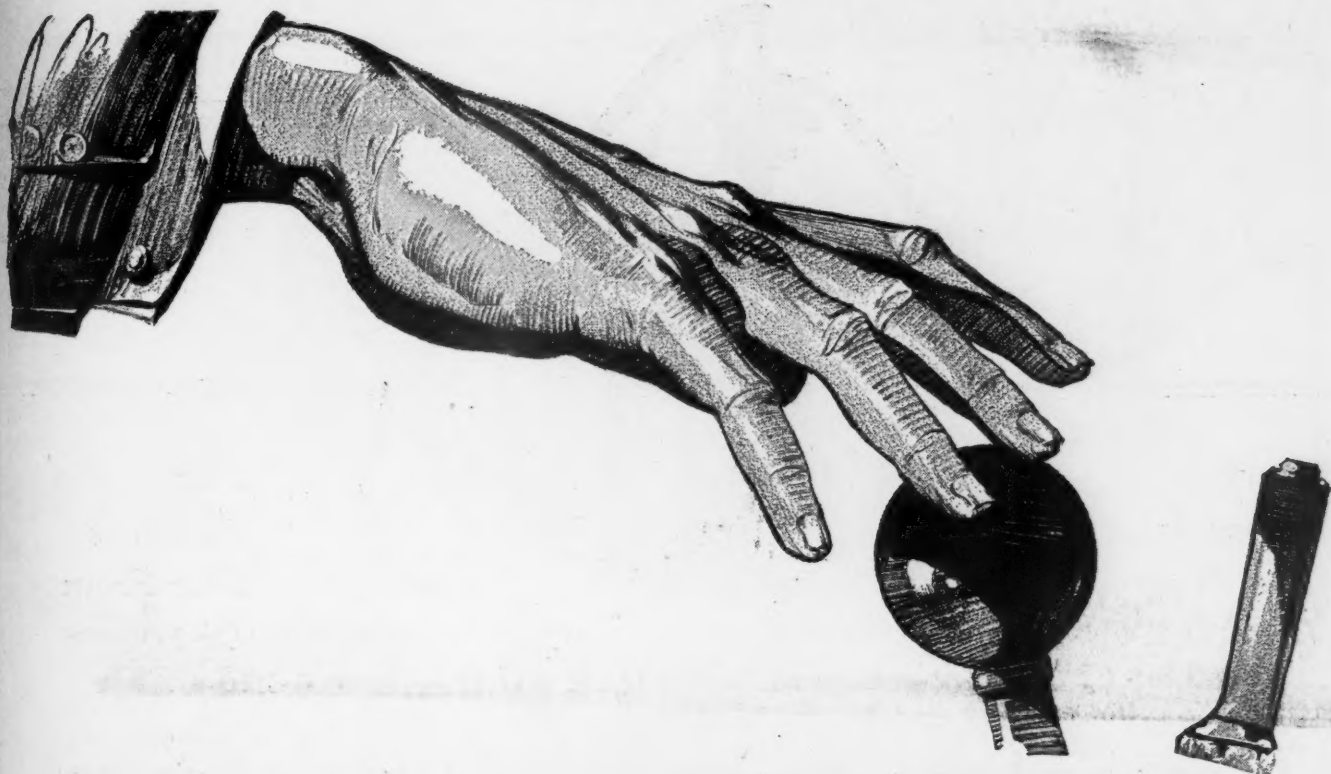
It saves your time, and time saved is money earned. Use it!

Chilton Automobile Directory

(Published Quarterly)

Market and 49th Streets

Philadelphia, Pa.



TIMKEN

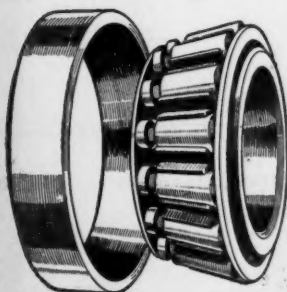
TAPERED ROLLER BEARINGS

Shift!

Gear meets gear with terrific pressure! Transmission bearings must stand the shock of conflict between engine power and car inertia. They've got to keep gear shafts in line, gear teeth in mesh.

And Timkens do it! With their tapered rollers that successfully meet every combination of radial and thrust loads—with their easy take-up for wear—with their big margin of safety—they keep gears on the job, prevent undue wear and loss of power.

At Points of Hard Service



Timken Tapered Roller Bearings are used in the great majority of automotive vehicles at points of hard service:

Transmission Pinion Shaft
Front Wheels Differential
Rear Wheels Steering Knuckle
Rear Axle Gears—Worm Gear,
Internal Gear, Bevel, and Double
Reduction.

This leadership is established on the tapered principle of design, quality of manufacture, performance on the road, and service to the automotive industry.

THE TIMKEN ROLLER BEARING CO., Canton, O.



Plants manufacturing complete bearings at
Canton, O.; Columbus, O.; Birmingham, Eng.; Paris, France
General Offices, Steel, Rolling and Tube Mills, Canton, Ohio



Timken Tapered Roller Bearings for Passenger Cars, Trucks, Trailers, Tractors, Farm Implements, Machinery, and Industrial Appliances



***Every
Ounce is
Free From
Dirt***

***Every
Ounce is
Free From
Dirt***

Wood's

Time and Labor-Saving Barrel Grease Injector

Closing a truck deal begins the most important part of the sale—the service maintenance. Every truck dealer well knows that lubrication is the biggest factor in this service and wisely advises his customer accordingly.

Overseas service has made enviable endurance records for several well known motor trucks, principally because they were thoroughly inspected and lubricated.

The handy Wood's Barrel Grease Injector, attaching to all barrels and pumping any grease in any weather, not only keeps your customers' trucks running efficiently, but makes your lubrication department show real profits. And "Every Ounce is Free from Dirt."

A simply designed, ball-bearing wheeled truck supports a barrel weighing as much as 500 pounds, making handling easy. The Wood's is a remarkable time and labor saver and has proved indispensable wherever used. Every truck owner aims to keep his truck in motion and the speed and general efficiency of the Wood's greasing device is much appreciated.

Write for Our Descriptive Folder and Special Proposition

The Bennett Injector Company

*Manufacturers and Inventors of
Grease and Oil Handling Devices*

Muskegon

Michigan



Sell a Standard Highland Body and Cab With Each Chassis

The Highland Line

"EVERYDAY" CLOSED CABS

HIGHLAND OPEN CABS

"EVERYWAY" FARM BODIES

HIGHLAND STAKE BODIES

HIGHLAND EXPRESS BODIES

PITTSBURGH DISTRIBUTOR:
Pittsburgh Commercial Body Co.,
5978 Centre Ave. Pittsburgh, Pa.

EVERY dealer in Detroit-made trucks can now sell a standard high-quality Highland Cab and Body with each chassis, make a reasonable profit on it, and give his customers better bodies at a price that meets competition.

The cab and body can be ordered from the Detroit branch of the Highland Body Company at the same time that the chassis is ordered from the factory, and shipped in the same car with the chassis.

That makes delivery on time certain. It cuts down transportation expense on the body to practically nothing. All types of Highland Bodies are constantly carried in stock at Detroit and are always ready for shipment.

Similar stocks are being placed with distributors at leading truck distribution points thruout the country.

Right now, for winter use, there is a big demand for Highland "Everyday" Closed Cabs. And Highland "Everyway" Farm Bodies which can be made up for any load the farmer has to carry always have a big call from farmers.

The Highland name is known wherever trucks are sold. The profit to the dealer adds something to his success.

Complete Literature, Including All Dimensions and Terms to Dealers, Sent on Request

THE HIGHLAND BODY MFG. COMPANY
Elmwood Place CINCINNATI, OHIO
DETROIT BRANCH, Greenwood and Holden Aves.

HIGHLAND

STANDARD
CABS and
BODIES

VEHISOTE:

(Trade-Mark)

*Efficiency
General Satisfaction
Economy*



VEHISOTE SIDE PANELS

Guaranteed not to split,
crack or check. Think
what this guarantee
means to YOU!

Vehisote, like steel, is made by a fluxing process in which all the fibres run together, interlock and interlace so that it becomes all one homogeneous material in which there is no point of separation, no grain as in wood, no laminations as in built-up or stuck-together products. Therefore, it cannot check or split.

It is the nature of wood to split and crack under strain. How is this natural defect to be cured by gluing pieces of wood together?

Wood is wood, has always been and always will be.

THE PANTASOTE COMPANY

11 Broadway, NEW YORK

CHICAGO: Peoples Gas Building

DETROIT: Penobscot Building

JOBBER:

The Scovel Iron Store Co., San Francisco, Cal.
Sligo Iron Store Co., St. Louis, Mo.
E. D. Kimball & Co., Chicago
E. C. Kadow & Co., Chicago
C. H. Tiebout & Sons, Brooklyn, N. Y.
N. Langer & Sons, Brooklyn, N. Y.
H. D. Taylor & Co., Buffalo, N. Y.
W. E. Kleine & Co., New York City
H. Hett & Sons, New York City

W. T. Crane Carriage Hardware Co., Newark, N. J.
Gerhab & Ludlam, Philadelphia, Pa.
John C. Hills, Trenton, N. J.
Moseman-Yarnelle Co., Fort Wayne, Ind.
Wm. Stockhoff, Louisville, Ky.
Faeth Iron Company, Kansas City, Mo.
Minneapolis Iron Store Co., Minneapolis, Minn.
Nicholas, Dean & Grigg, St. Paul, Minn.
Shadbolt & Boyd Iron Company, Milwaukee, Wis.



The Torbensen Rear Axle for Speed-Wagons

Torbensen is really the logical speed-wagon axle, because it is so sturdy, and yet so light. It is unusually economical in operation and in upkeep as well, having all its working parts enclosed, amply lubricated and fully protected from dust, dirt and mud.

TORBENSEN AXLES

CLEVELAND, OHIO

Wetprufe



What a Good Fan Belt Means to Your Motor

The best designed cooling system will not function properly without a GOOD fan belt.

Fan belts that soon stretch and slip cut down the speed of the fan and reduce motor efficiency.

Most of America's leading makers of motor vehicles equip their products with "Wetprufe" Fan Belts because they know it pays to buy the best.

Their splendid quality results from the use of choice oak-tanned leather and special treatments which make them proof against heat, water and oil, and render them soft, pliable and long-wearing.

Made in all standard sizes or to your specifications. Also furnished in handy rolls if you desire to make up your own belts.

Put a "Wetprufe" belt on test and prove for yourself its superiority. Write us for a sample belt.

Hide Leather & Belting Co.
Indianapolis, U. S. A.



Pulling Power of PIERCE-ARROW 2-ton, 3 $\frac{1}{2}$ -ton, 5-ton Dual Valve Trucks

Dual Valves produce much greater power, surprising economy of operation and surpassing performance.

Increased valve area facilitates intake and exhaust of gas. Double ignition assures complete combustion—delivering *the full explosive power, saving gasoline* and increasing efficiency.

Other advantages produced, without sacrifice of durability, long life or continuous operation, include accessibility to quick repairs and easy operation—both saving time and reducing labor costs.

Pierce Arrow

48 of the FIRST FIFTY
trucks still running
after 9 years' service.



Delivers more work in a given time.

Loses less time on the job and off the job.

Costs less to operate and less to maintain.

Lasts longer, depreciates less, commands a higher resale price.

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.



Maintain Daylight Schedule Throughout the Night

THE **Exide** BATTERY

For Gas-Truck Starting and Lighting



THE element of danger in night driving is too great to warrant "daylight speed" unless the road ahead is clearly illuminated.

Electric light, furnished by a storage battery especially built to withstand the vibration of truck service, is consequently more than a mere convenience—it is insurance against accidents.

The Exide Battery for Gas Trucks is making good on solid-tired trucks where ordinary batteries were quickly ruined by vibration. It requires no special spring mounting to absorb the shocks. *It is built to withstand them.*

For this battery was designed by us for use in Uncle Sam's Army Tanks—the roughest service in which storage batteries have ever been used.

Write us. We'll be glad to give you detailed information on this most sturdy battery.

THE ELECTRIC STORAGE BATTERY CO.

Oldest and largest manufacturers in the world of Storage Batteries for every purpose

1888 PHILADELPHIA 1920

Branches in seventeen cities

Special Canadian Representatives: Chas. E. Goad Engineering Co., Limited
Toronto and Montreal



Happy, Hurry-Up, Action!

When a Walker Badger Truck Jack sets its sturdy shoulders under an axle—things move—and move *quick*. There is a true American spirit of "let's go" in action of a Walker Badger Jack.

It asks no odds. It isn't choicy about *where* it goes into operation. Merely give it working room—and it's ready and eager for business.

This surity of action—ease of action—speed of action and strength that never crumples under hardest knocks—are due to superiority of design and skillful construction. Walker Badger Truck Jacks are made right—right from the beginning. Each section built of materials best suited to the use—hardest, longest lived metals. Drop-forged steel pawls—of greatest wearing quality. Every moving part machined in jigs—and assembled with accuracy which gives free, easy action.

Equipped with automatic lock—that never fails to lock and stay locked.

Factory tested to lift more than rated capacity—and guaranteed to do so without breakage or difficulty.

Jacks of proven worth, which give you positive protection against jacking trouble in every shape.

Jobbers and Dealers find quick sales and profit response in the Walker Badger line—"A Jack for every Job"—because of a universally established reputation of absolute reliability.

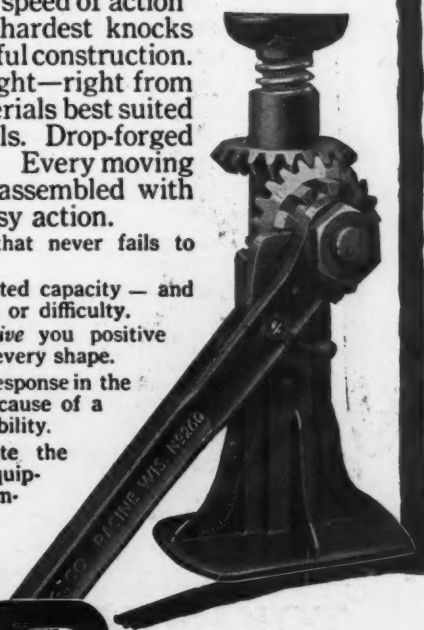
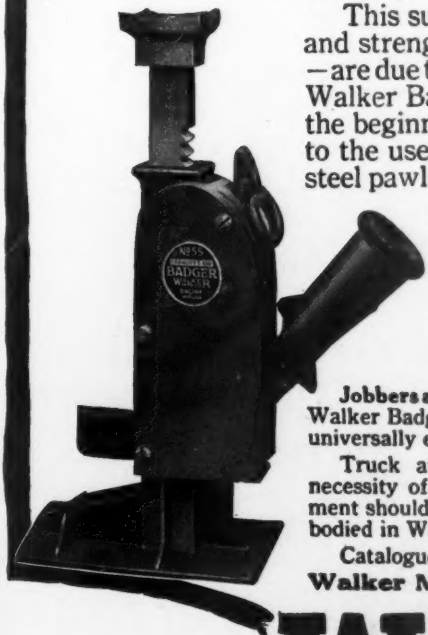
Truck and car manufacturers who appreciate the necessity of furnishing thoroughly meritorious equipment should investigate the many superiorities embodied in Walker Badger construction.

Catalogue upon request.

Walker Mfg. Co.

Racine, Wis.

WALKER BADGER TRUCK JACKS



Let Us Solve All Your Gasoline Oil Storage and Dispensing Problems



Our trained engineering staff is at your service, to devise the most efficient and economical ways and means for—

1. Storing and dispensing gasoline for your motor trucks and passenger cars.
2. Storing and dispensing lubricating oils for your trucks and passenger cars.
3. Storing and dispensing lubricating and other oils for your factory.
4. Reducing leakage losses in handling all kinds of oils for all purposes.
5. Reducing the fire hazard by keeping the premises clean.
6. Keeping accurate record of all gasoline and oils bought and used, for all purposes, as our measuring and recording apparatus are accurate and dependable.



STOP UNSEEN LEAKS AND LOSSES

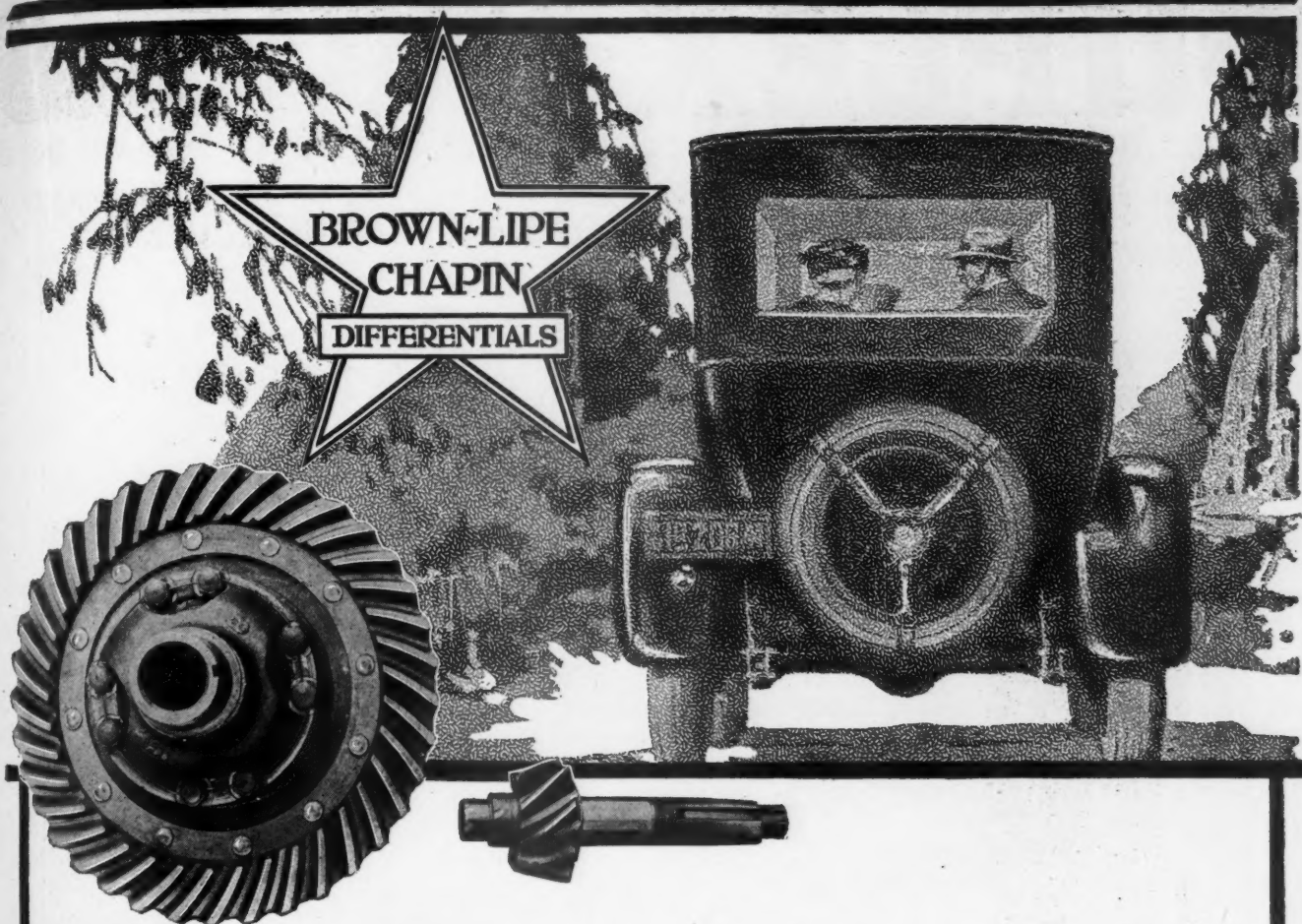
They may be costing you more than you think. A survey of your plant by a TOKHEIM expert will cost you nothing ; and it may result in important economics for you.

Send for Our Industrial Bulletin

TOKHEIM OIL TANK & PUMP COMPANY

1603 WABASH AVENUE

FT. WAYNE, INDIANA



Silent Operation— An Absolute Essential—

THE owner of to-day's car demands a freedom from noise and smoothness of operation that the manufacturers of yesterday never deemed possible.

Improvements originated and exercised in Brown-Lipe products have materially assisted in making it possible for the car manufacturer to meet these demands.

Brown-Lipe organizations are ceaselessly working to bring automotive development to a yet higher plane.



BROWN-LIPE GEAR CO.
TRANSMISSIONS

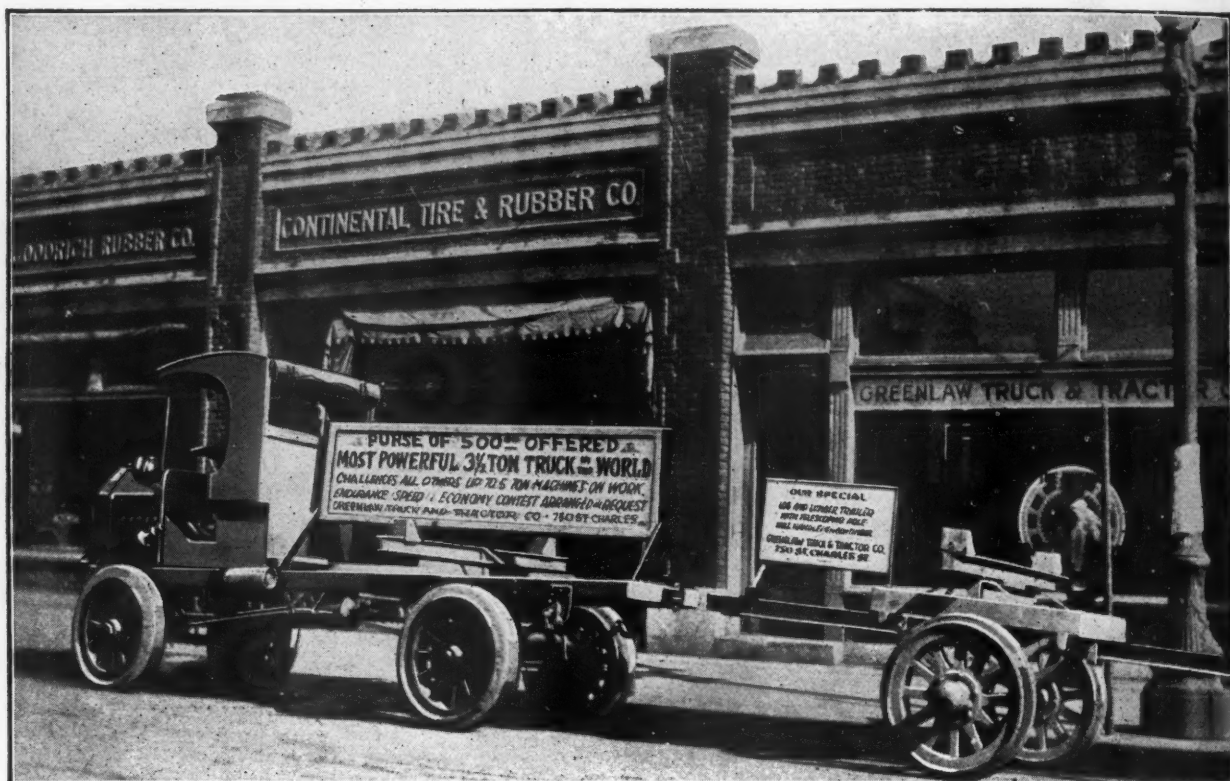
BROWN-LIPE-CHAPIN CO.
DIFFERENTIALS

Both at SYRACUSE, N. Y.

No. 18 of 40 Reasons for Superiority

DUPLEX TRUCKS

BUILT FOR BUSINESS



The \$500 Challenge That Has Never Been Accepted By Any Truck Maker or Dealer

*"The Most Powerful 3 1/2 Ton Truck in the World Challenges All Others
Up to 5 Ton Machines on Work, Endurance, Speed and Economy.
Contest Arranged on Request"*

THE Greenlaw Truck & Tractor Company, Duplex dealers in New Orleans, Louisiana, have hauled this sign all over the city for more than a year—and have never had a taker.

Can you imagine what would happen if any other truck in the world were to parade such a sign—how quickly the offer would be taken up and the fact disputed by several other makes of trucks?

Do you know of any truck dealer anywhere who has confidence enough in his line to post such an offer as this? More important still—do you know of any truck dealer in the world who has a truck that can back up such an offer as this?

Absolutely without question, as a powerful, dependable, economical mover of heavy freight, the Duplex 4-Wheel Drive is without an equal. It stands admittedly in a class by itself—and whenever a demonstration is arranged it always walks away with the honor and the sale.

It is a mathematical principle that four driving wheels gives

three times the power that two driving wheels can give no matter how good the two-wheel drive truck may be.

The Scientific American magazine said that the 4-wheel drive truck is the only one that utilizes the weight of the load and of the truck itself.

The Duplex design eliminates the wear and tear by equalizing the strain—makes the truck last longer and operate more economically. The Duplex clearance of 15" together with its admitted power superiority enables the Duplex 4-Wheel Drive to travel over roads that are simply impossible for any two-wheel drive truck of whatever make.

These Duplex facts are becoming better and better known—and there can be no question that the Duplex dealers are among the few who will find their business in a safe, solid state under any conditions.

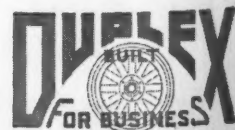
It is an old axiom that the first essential of merchandizing success is a good article and in the Duplex 4-Wheel Drive you have absolutely got a world beater.

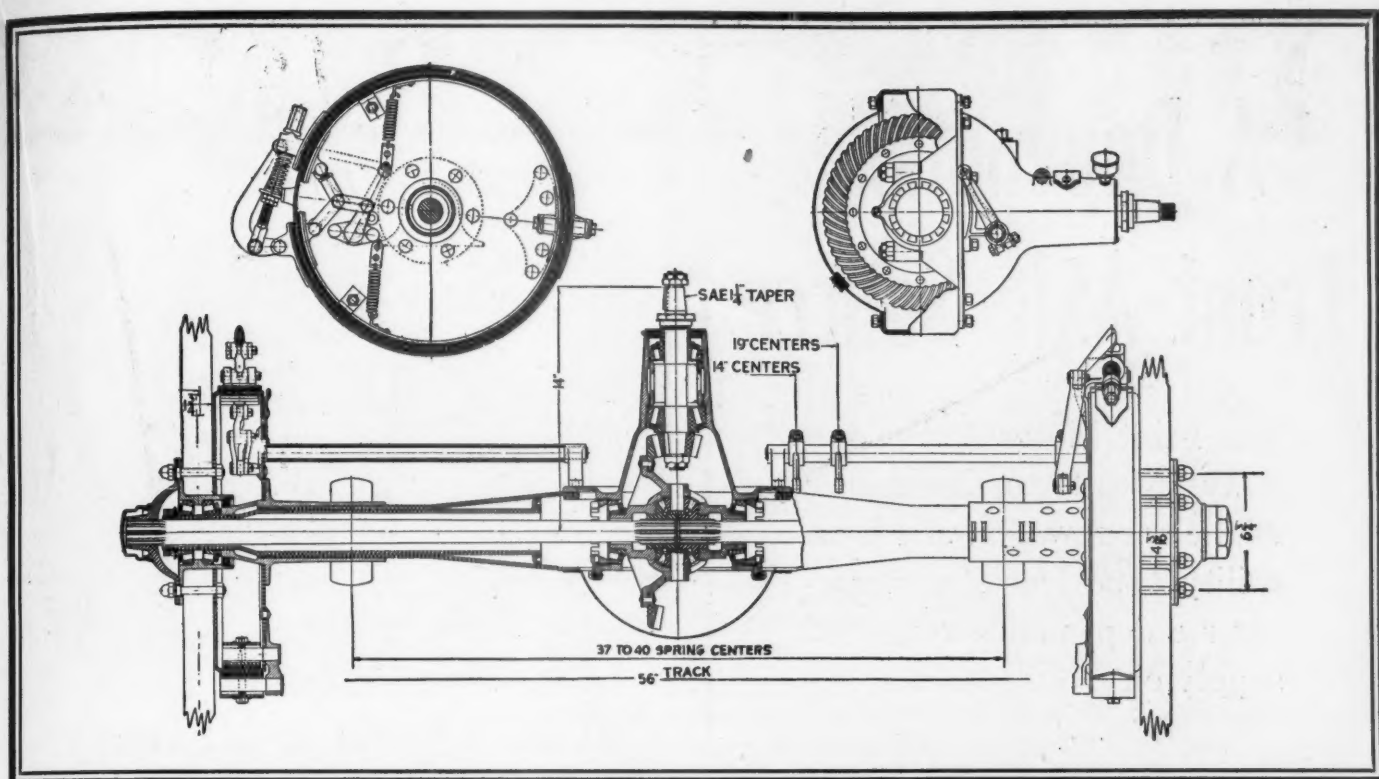
The Duplex Limited for all round medium capacity, high speed hauling is also a World's Record Truck. On October 1st at Indianapolis Speedway, it made 935 miles in 24 hours' continuous operation—the most remarkable run ever undertaken by any truck in America and the first time in America that any automotive vehicle on land ever operated 24 hours consecutively. Here is a truck that appeals to 75% of the truck users of America. It is destined to be a conspicuous success.



Duplex Truck Company
Lansing • Michigan

One of the Oldest and Most Successful Truck Companies in America





Columbia One-Piece Housing and Bevel Gear Applied to High-Speed Truck Axles

IN the light, high-speed truck the severest strains are concentrated upon the rear-end mechanism.

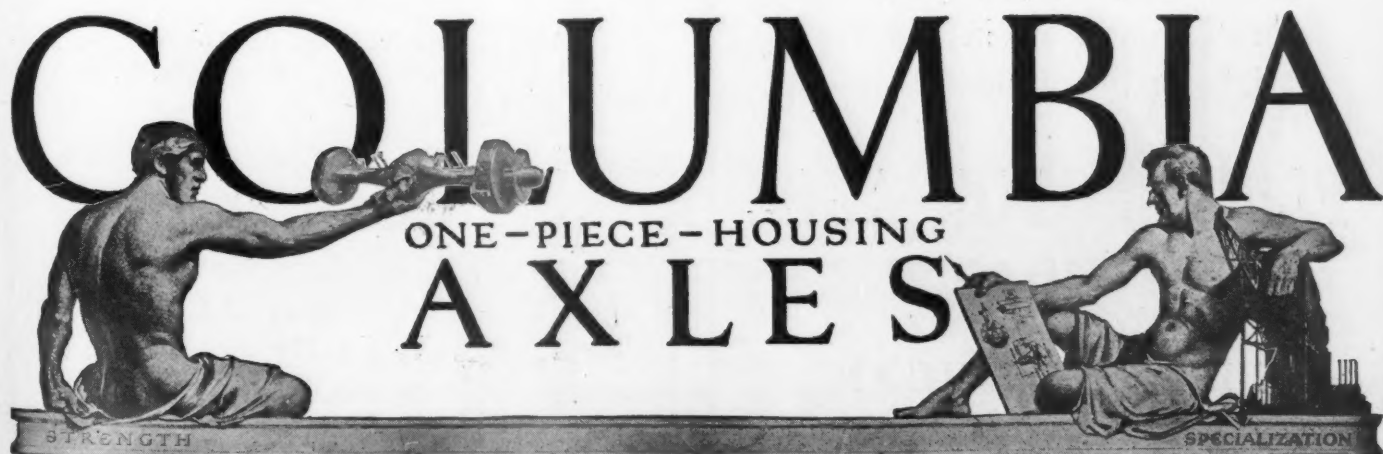
The Columbia Axle Company has made a special study of this problem with the result that the famous Columbia Bevel Gear and One-piece-housing Principles have been applied to the construction of a remarkably

strong, efficient rear-end equipment.

The Columbia Housing is formed from a single piece of heavy sheet steel, and welded in but one place instead of two. This provides 50% greater torsional strength. Gears and shafts are extra size.

Columbia Front Axles for this special purpose also have extra strength.

The Columbia Axle Company, Cleveland, Ohio



A Dependable Front Axle Source

The Flint Motor Axle Company presents to the builder of the speed wagon and farm utility type truck manufacturer a dependable source of supply on

FRONT AXLES

1,000 Lb. to 2 Ton Capacity

We have specialized in the production of front axles of these capacities for the past 5 years. Our organization and manufacturing equipment is adapted for quantity production.

We can guarantee prompt and efficient service at right prices—and maintain our high quality standard.

FLINT MOTOR AXLE COMPANY

FLINT, MICHIGAN

HAUCK STORAGE BATTERY STEAMER



918

You Open a Battery in 3 to 6 Minutes

with a Hauck Storage Battery Steamer.

Eliminates possibility of cases becoming water-soaked and warping. Banishes risk of breaking rubber covers, jars or plates.

Costs 8 cents an hour to operate, with kerosene at 16 cents a gallon. Boiler can also be heated with gas burner. The Hauck speedily generates steam and applies it with hose thru vent holes of battery cells. Softens sealing compound almost instantly.

Saves the repairman much valuable time and labor. Write for full particulars.

The Hauck Torch for Every Heating Job

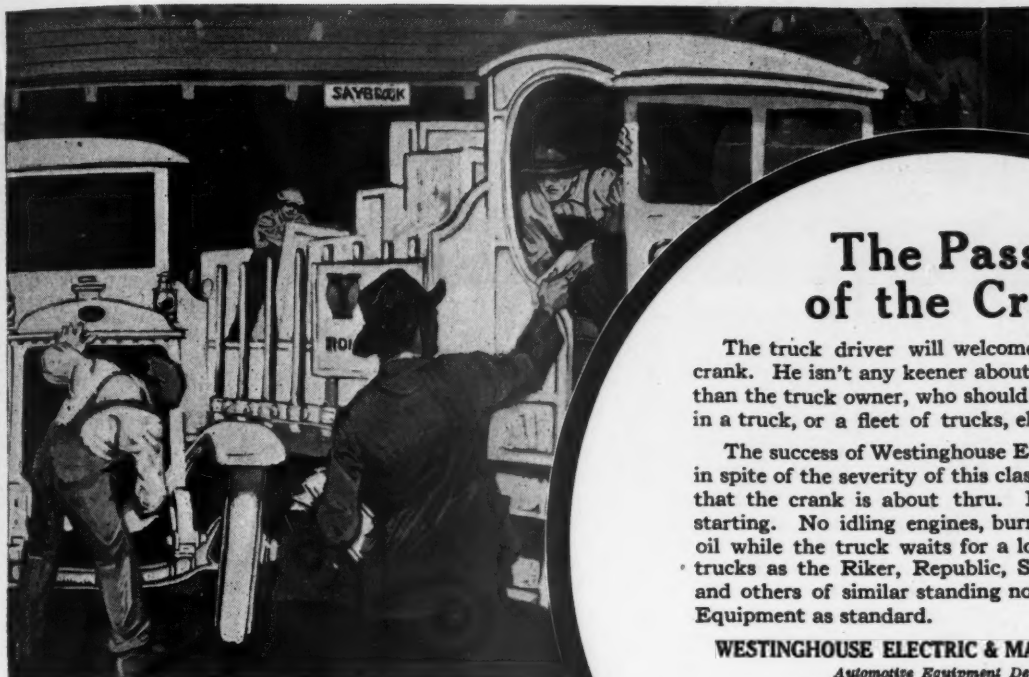
For small jobs as well as heavy ones.

For straightening axles, shaftings, frames; brazing cross rods, wrought iron cases; annealing and tempering machine parts, etc. One quart of kerosene used in the Hauck lasts twice as long as two quarts of gasoline in a gasoline torch—and is cheaper.

The Hauck is simple, reliable; does more and heavier work than any gasoline torch—and is safer. You need it. Write.

HAUCK MANUFACTURING CO.
101 11th Street Brooklyn, N. Y.





The Passing of the Crank!

The truck driver will welcome the passing of the crank. He isn't any keener about cranking an engine than the truck owner, who should recognize the profit in a truck, or a fleet of trucks, electrically equipped.

The success of Westinghouse Equipment on trucks, in spite of the severity of this class of service, suggests that the crank is about thru. No more delays in starting. No idling engines, burning up gasoline and oil while the truck waits for a load. Such makes of trucks as the Riker, Republic, Service, Vim, Parker and others of similar standing now use Westinghouse Equipment as standard.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

Automotive Equipment Department

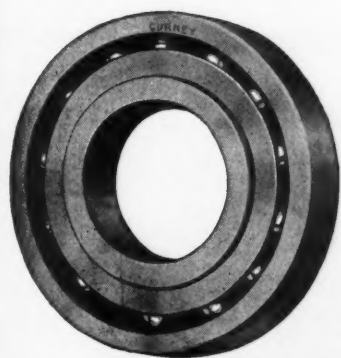
General Sales and Service Offices:

82 Worthington St., Springfield, Mass.

Westinghouse

ELECTRICAL EQUIPMENT FOR AUTOMOTIVE VEHICLES

Gurney Bearings Have High Factor of Safety



Of course you know the factors of safety determine the size of every part of a machine.

The greater factor of safety of Gurney Ball Bearings permits you to use smaller bearings, thus effecting a considerable saving in first cost.

Size for size, Gurney Bearings do secure higher load capacity than any other, because they use more and larger balls, and the raceways, closely approximating the balls' curvature, greatly increasing their capacity under stress.

Moreover, Gurney Ball Bearings, by combining both radial and thrust loads on a single row of balls, effect a still further reduction of weight and space by making one bearing do the work of two.

Let our Engineering Department submit you a correct mathematical solution of your bearing problems.

GURNEY BALL BEARING CO. Conrad Patent Licensee **Jamestown, N. Y.**

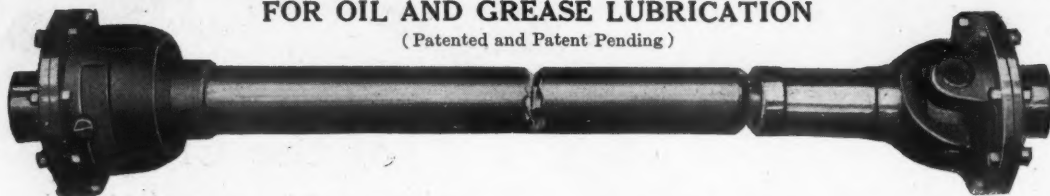
GURNEY

BALL BEARINGS

"M & E" Universal Joint

FOR OIL AND GREASE LUBRICATION

(Patented and Patent Pending)



The "M & E" Universal Joint was adopted by leading manufacturers of more than thirty cars and trucks and has been installed as standard equipment.

The above illustration clearly shows the construction of the Joint with and without housing.

Great strength, simplicity in design, durability and accessibility are characteristics of the "M & E" Universal Joint.

Made in four sizes up to 100 horsepower. Shafts up to 3 in. diameter. Angle of drive up to $15^{\circ}\pm$. Has very large bearing surfaces. Hardened and ground working parts. Dust-proof housing, which acts as an oil-tight reservoir for the lubrication.

Let our staff of engineers explain how these Joints can be practically and economically installed in your car.

SEE OUR EXHIBITS AT THE NEW YORK
AND CHICAGO SHOWS

New York: Grand Central Palace, Jan. 8th
to 15th. Spaces C-75-76, Third Floor.

Chicago: Coliseum, Jan. 29th to Feb. 5th.
Space No. 61, Gallery.

MERCHANT & EVANS CO.

NEW YORK

PHILADELPHIA

WHEELING

BALTIMORE

CLEVELAND

LANCASTER, PA.

DETROIT

ATLANTA

CHICAGO



KANSAS CITY

1½ TO
6 TONS

TIFFIN

MOTOR
TRUCKS

Bodies—



THE practicability and strength of Tiffin Motor Truck Bodies is a big point in their favor.

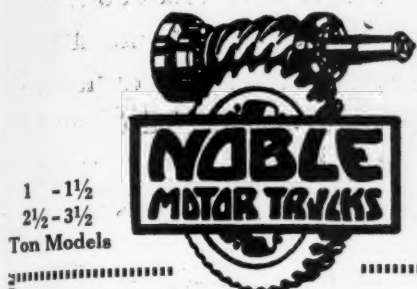
(Many good trucks are handicapped by bodies not sufficiently well constructed, and improperly designed for effective service.)

Tiffin Bodies are built in our own shops, where the facilities and experience of over a quarter of a century unite to provide bodies that are a great source of satisfaction to Tiffin Truck users.

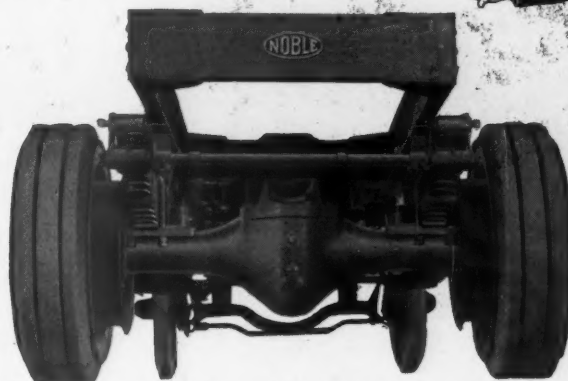
ASK FOR TIFFIN BODY LITERATURE

THE TIFFIN WAGON COMPANY, Tiffin, Ohio

"That Name Stands for Highest Quality Units"



1 - 1½
2½ - 3½
Ton Models



Your average customer knows from hearsay what are the finest types of units of the high-class truck assembly.

The selling resistance you would otherwise encounter is therefore materially lessened when you point out to him the many Noble parts with which he is acquainted—and in which he has confidence; such as:

The rugged, long-lived Buda Motor; dependable Fuller Transmission; unfailing Eisemann Magneto; Stromberg Carburetor; Lavine Steering Gears; Sheldon Worm Drive Rear Axle, etc.

Your customer recognizes these famous features at once. Further, he notes you have the truck capacities that exactly meet his needs. Your prices are right.

What's the Answer?

Let us send you the enthusiastic dealer comment on the impressive volume of customer *buying* answers. Write.

NOBLE MOTOR TRUCK CORPORATION

Kendallville

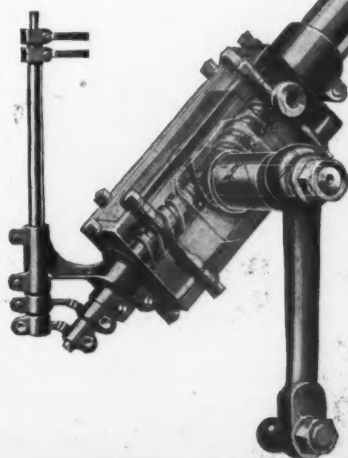
Indiana

THE WOHLRAB

The one perfect Steering Gear.
Our patented design permits all hardened steel wearing parts.

Easy to inspect.

Easy to adjust.



Easy Steering

Reduce your service expense.

Reduce your customers' operating expense.

THE WOHLRAB GEAR CO.
RACINE, WISCONSIN



No. 37. Prest-O-Grip Dual Clamp

The standardized line of traction chains for all solid tire wooden wheel trucks with clearance for any anchored equipment. Can be sold by tire sizes of trucks, no other information needed.



Made by

The Rowe Calk and Chain Company, Plantsville, Conn.

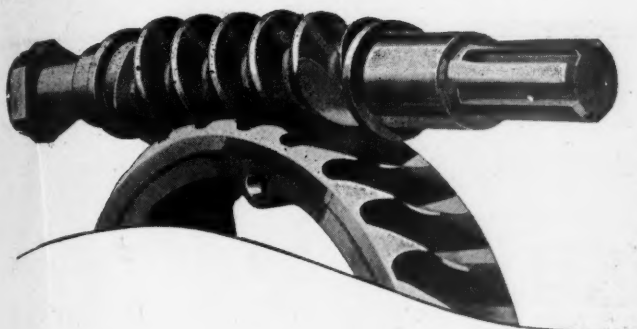
Prest-O-Grip
Spoke Clamps

Prest-O-Grip
Traction Chains

Prest-O-Grip
Lock Links

Hi-Lo
Jacks





The Dependable Worm Gear

Not in the history of engineering has there been developed any other gearing at once so simple, so direct, so compact as the worm gear.

In the worm gear drive the only elements are the worm and gear. Compare:

The worm gear permits the only true straight-line drive—no angularity power losses.

The worm gear is the easiest of all gears to lubricate efficiently.

It is the only truck drive that stays silent; it positively refuses to be noisy.

It is the only gearing whose efficiency curve shows an upward tendency with use.

And though we have known of worm gear records in excess of 200,000 miles, we never heard of a good worm gear wearing out.

These are some of the reasons why leading truck builders have, by a vast majority, signified their preference for the worm gear drive.

The resources of our Engineering Department are at your disposal. Write us.

The Cleveland Worm Gear Co.

"America's Worm Gear Specialists"

Cleveland, Ohio, U. S. A.

C. F. Quicke & Co.
315 Euston Road, London, N. W.

Alfred H. Coates & Co.
251 Rialto Bldg., San Francisco, Cal



Cleveland WORM GEARS

OTHER GEARS WEAR OUT. THE WORM GEAR WEARS IN.



"YOU CAN TRUST GARCO"



GARCO stops the buyer the way it stops his car. It holds business the way it holds brakes. It is safe for the dealer to carry because it is safe for the driver to use. GARCO plays a sweet tune on the cash register.

And all because GARCO is made with a generous margin for safety and long wear—extra strong, durable, dependable. Its *solidly woven* construction is possible only through the extra heavy looms that weave it. Its natural compactness and multi-wire reinforcement give it a holding and wear-resisting power that is as effective when worn to wafer-thin thickness as when newly applied.

Your conscience will never trouble you when your recommendation is GARCO. We'll help you on the selling end. Write for proposition—whether dealer, repair shop, or jobber.

GENERAL ASBESTOS AND RUBBER CO.

Main Office and Factories
CHARLESTON, S. C.

Branches and Complete Stocks
58 Warren Street, New York
14 North Franklin Street, Chicago
311 Water Street, Pittsburgh

ASBESTOS PRODUCTS

Packings
Locomotive Throttle and Air Pump Packings
High Pressure Piston Packings
Valve Stem Packing
Medium and Low Pressure Packings
Perfect Valve Rings
Flax Packings
High, Low and Medium Pressure Sheet Packings
Gaskets and Gasketing Material
Asbestos Wick and Rope
Asbestos Cement
Asbestos Automobile Specialties

Brake Lining
Transmission Lining for Fords
Cone Clutch and Disc Clutch Facings
Asbestos Spark Plug Yarn

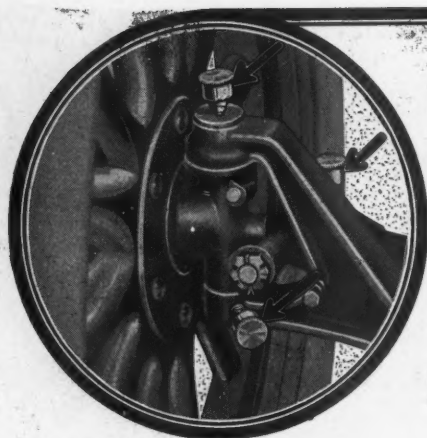
Asbestos Textiles
Cloth Yarn Cord
Carded Fibre Braided Tubing



GARCO

ASBESTOS

BRAKE LINING



Standard Factory
Equipment on

Stewart
MOTOR TRUCKS

Shown here as used on the Front Spindle
of the Stewart No. 12-2000 Pound Trucks



EMPRESS GREASE and OIL CUPS

Their absolute dependability, proven service,
ease and economy of operation have made
them the standard lubricator equipment on
the majority of motor trucks.



EMPRESS No. 200
PLAIN COMPRESSION GREASE CUP

An excellent cup for motor truck lubrication, built
to withstand the most exacting service. Made up of but
two parts, cap and base, and drawn from rolled sheet
metal, it provides a cup which cannot get out of order
and one which is practically indestructible. Made
from brass or steel in eight sizes: $\frac{3}{4}$ in. to $3\frac{1}{2}$ in.
diameter of body. Five different finishes.

Write for Catalog F

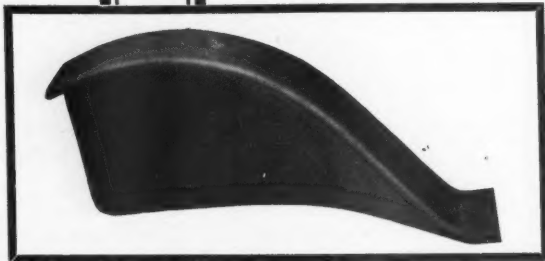


BOWEN PRODUCTS CORPORATION

Manufacturing and Sales Divisions
Auburn Div., Auburn, N. Y. Winkley Div., Detroit, Mich.
Cleveland Div., Cleveland, Ohio
Minneapolis Div., Minneapolis, Minn.

Branch Sales Offices
New York, 220 Broadway. Chicago, 1607 Otis Bldg.
San Francisco, Monadnock Bldg.
Boston, 903 Dexter Bldg. Cincinnati, 409 Lyric Bldg.

For Service and Appearance



Sheet Metal Parts that receive careful considera-
tion from buyers are selected on the basis of
quality and style. The tendency is becoming
more marked for motor truck makers to select

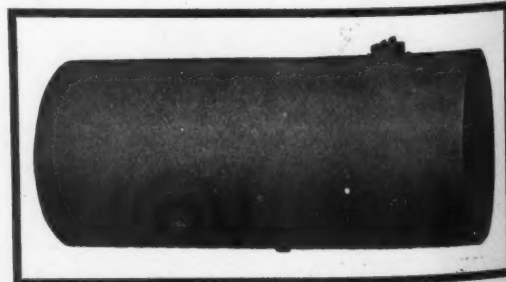
Sheet Metal PARTS

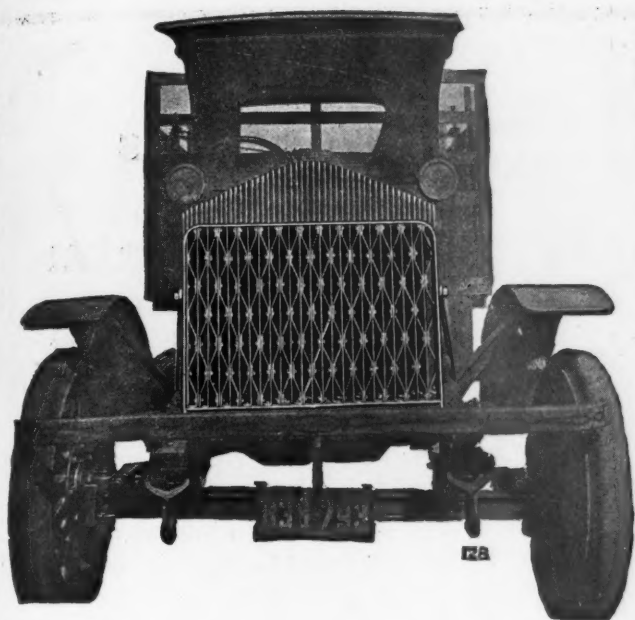
with the care and attention they deserve. Our Acetylene-welded
Tanks, Fenders, Sod Pans, and Stampings are sturdily constructed
to last with built-in quality that resists wear.

You can secure this certainty of quality and pleasing appearance as
well at prices that are surprisingly
reasonable. Consult us about Hoods,
Fenders, Tanks, etc. We can sat-
isfy you as to quality, deliveries and
price.

Motors Metal Mfg. Co.

Milford Ave. and P. M. Ry. Detroit, Michigan





A Blow is Distributed Over the Entire
Area of an

IRVING SAFETY RADIATOR GUARD

If only one individual member of a radiator guard must or may bear the impact of a front-end collision, it will probably yield and damage or destroy the radiator. But with an **Irving Safety Radiator Guard**, real protection is given. The alternate straight and reticuline bars, solidly riveted together, make the panel a real truss, distributing the blow or pressure over the whole guard.

Weight for weight and span for span, the **Irving Subway** forming the **Irving Radiator Guard** will withstand a heavier blow or pressure than any other form of guard—and eighty per cent of its area is open space for air circulation.

There's a size and style to fit your truck. Write for circular 1B36, stating your make and model

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

Manufacturers of

IRVING SUBWAY TRADE MARK
(PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING



Remember Teagle—

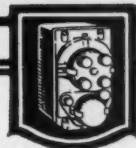
The quality of the Teagle Magneto's spark can be no more strikingly illustrated. Here it functions to satisfy with a comforting smoke. *In your Motor, it functions to satisfy with maximum power.*

**SIMPLICITY-RUGGEDNESS
EFFICIENCY-ECONOMY**

Always associate these Qualities with

TEAGLE MAGNETO

A BETTER SPARK



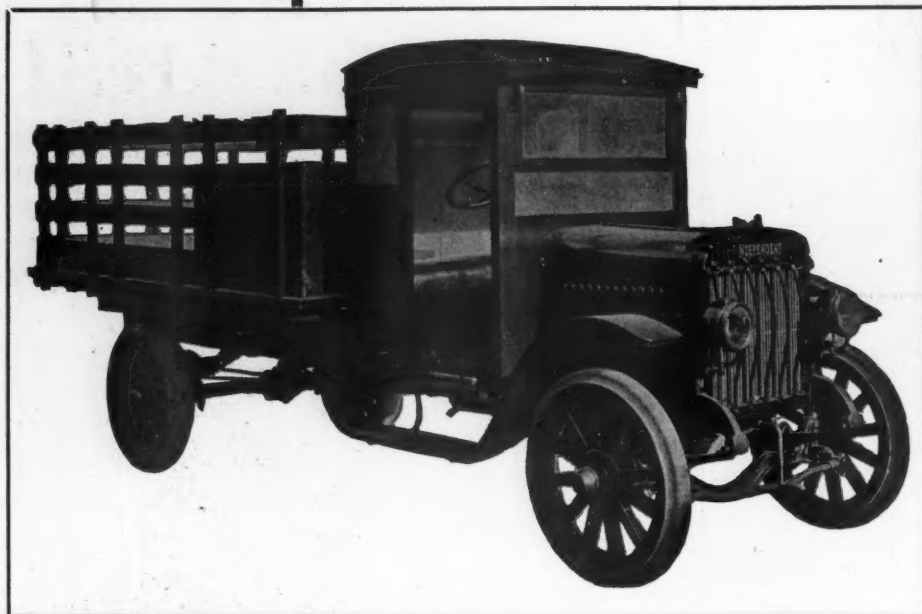
IN A SIMPLER WAY

Write 1129 Oregon Avenue for Details



CONFORMS TO S.A.E. STANDARDS
THE TEAGLE COMPANY CLEVELAND, O.



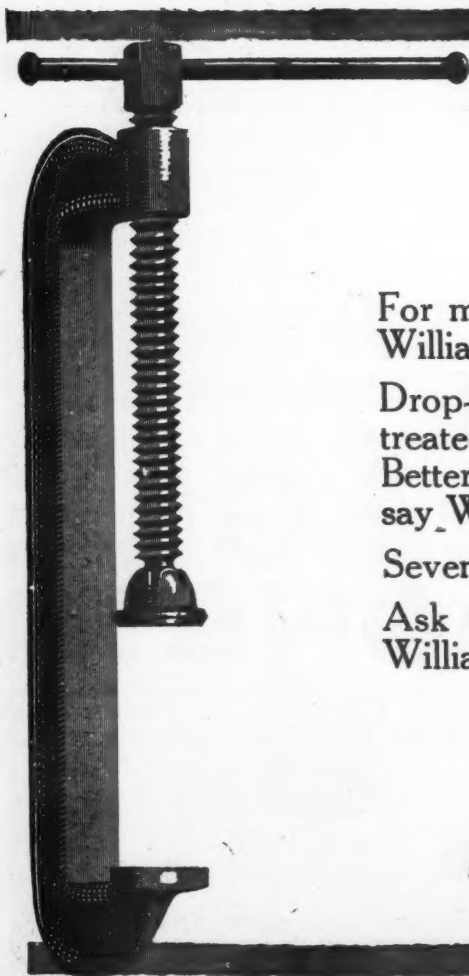


Independent Motor
Truck Co.
Davenport, Iowa

Measures UP TO Every Claim

Independent dealers never overstate the facts, because Independent Trucks represent the superlative in performance. They are equal to any task, giving dependable service over a period of years considerably longer than the average. Send for our literature—note the parts and general excellence of construction. Let us tell you how this big organization will place its unlimited resources behind the right type of dealer.

INDEPENDENT 1-1½-2 TON TRUCKS



WILLIAMS' SUPERIOR DROP-FORGED CLAMPS

For medium service there is no better clamp made than Williams' "Agrippa."

Drop-Forged from strong, tough, selected steel and heat-treated after forging, there is little possibility of springing. Better tools make better workmen and the best workmen say Williams' "Agrippa" are best.

Seven sizes for 4 to 18" capacity.

Ask for Machinists' Tools Book, which also describes Williams' Clamps for every purpose.

J. H. WILLIAMS & CO.

"The Drop-Forging People"

BROOKLYN
80 Richards St.

BUFFALO
80 Vulcan St.

CHICAGO
1080 W. 120 St.

Made in the Heart of the
Automotive Industry



UNIVERSAL JOINTS

CONSTRUCTION simplicity and strength of the highest order has been incorporated in ARVAC Model 20.

It not only retains the prominent features of ARVAC design and construction that have gained and held the confidence of the trade, but a close analysis of its many refinements reveals to the discriminating automotive engineer an unsurpassed achievement in universal joint construction.

Our engineers will, without obligation, furnish complete information and help you solve your universal joint problems.

Arvac
Manufacturing Company
ANDERSON, IND.



*The
Four Ways
One Auto
Maker Finds
Better
Cleaning
Pays—*

50% More Cleaning Work

The foreman claims he has been able to increase the output of the cleaning room 50% through the use of Oakite.

2 Men Instead of 8

Despite the increase of 50% in volume of work, only 2 men are now required, compared with 8 men formerly employed for the purpose.

No Rejects Instead of 15%

Rejections after japanning formerly ran as high as 15%, because parts were not properly cleaned before being placed in ovens. Now, no rejects are to be found.

Lower Cost for Cleaning

The entire cost of Oakite materials for upkeep of 700 gallon tank is only \$3.87 weekly—which is offset many times over by the saving in labor costs.

Oakite materials and methods are used in the above plant for cleaning pressed steel fenders, hoods, instrument boards, etc., from which paraffin oil must be removed before japanning. Caustic soda was formerly employed and gave unsatisfactory results.

May We Serve You, Too?

OAKITE
MANUFACTURED BY
OAKLEY CHEMICAL CO.
38 THAMES STREET • NEW YORK



INVESTIGATE THIS DESIRABLE TRUCK

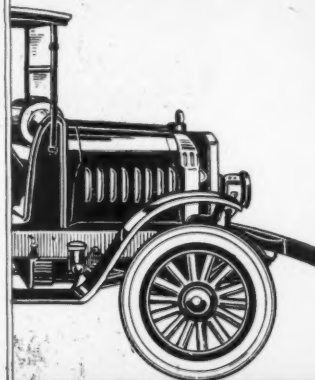
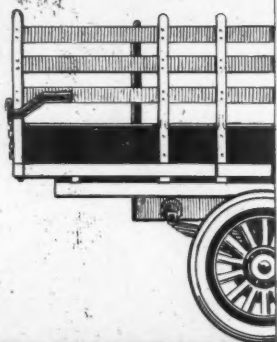
Many Dealers

have investigated the Larrabee line of trucks. Those acceptable to us are still Larrabee Dealers. This truck is not an experiment. It is a proven dependable truck. The company manufacturing it is sound, strong and lasting. We require dealers of a similar calibre.

Dealers looking for a truck manufactured by a concern operating with "The Good Business Policy" will find the Larrabee franchise one that will prove profitable, pleasant and satisfactory from every angle of the dealer's viewpoint.

If you want a better connection let us show you the Larrabee proposition. It's a profit winner. Write for full particulars. Address Sales Department.

LARRABEE-DEYO MOTOR TRUCK CO.
BINGHAMTON NEW YORK



LARRABEE TRUCKS

DROP FORGINGS

Open Hearth or Alloy Steel Capacity 1,800 Tons Per Month

Automobile, Truck, Tractor and General

Compliments
of the
Season

MACHINE FINISHED CRANKSHAFTS

Heat Treating and Complete Laboratory Equipment

UNION SWITCH & SIGNAL COMPANY

Pittsburgh District (2 Miles East of Pittsburgh) SWISSVALE, PA.

Odometer Users Don't Wait for "Conditions"

Cost of truck operation may go down, but you, the truck owner, can make it go down faster than old General Conditions will ever put it down!

Measure mileage received as carefully as you measure purchases of supplies; watch the truck-miles as closely as you watch truck costs.

Buy so much *mileage* rather than gallons, pints or pounds of supplies, and use a

Veeder



HUB ODOMETER

to see that you're getting out of your supplies the actual haulage value that is in them.

Veeder Odometers will be exhibited at both the Chicago and New York Automobile shows; the features of the mechanism will be demonstrated. Regular model, adaptable to all standard trucks, \$20. Special model for FORD Commercial Cars, \$15. Write for informative folder.

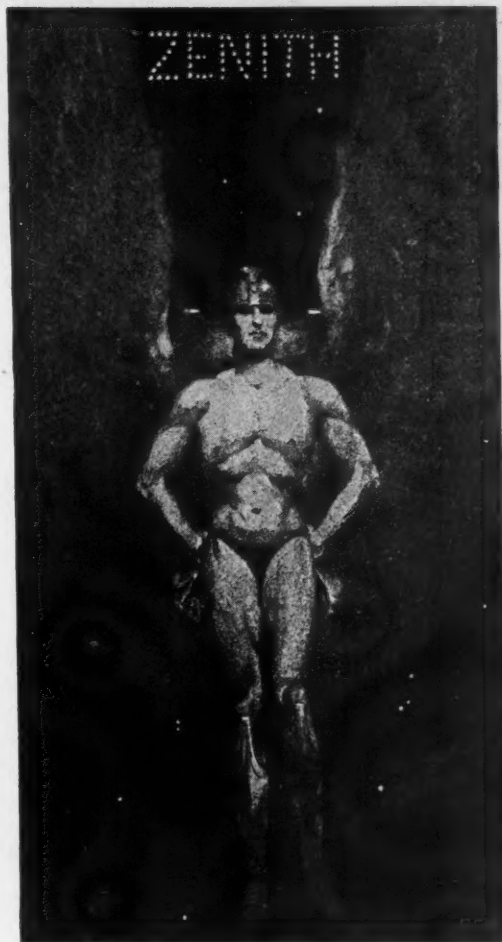
The Veeder Mfg. Co.

10 Sargeant Street Hartford, Conn.

New York Distributors: Quinlan-Treiber Corp., 5 Columbus Circle
 Detroit Distributors: Geo. F. Balk Sales Co., 9 Selden Street
 Philadelphia Distributors: Crown Auto Specialties Co., 1611 Vine Street

California Distributors

F. Somers Peterson Co., 57 California St., San Francisco, Cal.



WHAT automotive authorities think of the Zenith carburetor is indicated by the fact that Zenith is standard equipment on the majority of European automobiles and on more than one hundred American makes of motor cars and trucks.

Zenith Carburetor Co.

New York
Lyons

DETROIT
London

Chicago
Turin



Merits Approval and Gets It

It is a source of real satisfaction to the dealer to know that he is selling a dependable and worthy truck, and a *greater* satisfaction to feel that truck buyers in general are aware of its merits.

Acme has become favorably known to dealer and consumer alike by its *proved units*. Each of Acme's major parts has achieved an individual reputation for superior merit. Each part adds its prestige to that of Acme in molding buyers' opinion.

As a man who knows truck values, you will appreciate the specifications of the Acme truck. You will endorse the wisdom of Acme engineers in selecting only the best units as a basis of Acme design. With fine engineering skill they have molded these parts into a truck that has won an outstanding reputation for steady performance.

Write us for full details of Acme trucks. We have some investigation reports that will prove very useful and instructive.

Built in 1, 1½, 2, 3½ and 5 ton models

ACME MOTOR TRUCK Co., 364 Mitchell St., Cadillac, Mich.

On the radiator of every Acme is this seal of dependable performance



Trade mark registered U. S. and other countries

Showing the Dome Built Winter Cab



K-9 Adjustable Wrench

MOSSBERG

ALL STEEL WRENCHES AND TOOLS

A Business-Building Line

THE dealer who sells Mossberg Tools not only makes a good profit—he gets a quick turnover on his stock and builds up his trade through satisfied customers.

The completeness of the Mossberg line makes the possibility of a sale greater. There is a wrench or tool for every purpose.

The garage man, the motorist, the expert mechanic, each with his individual requirements, may find the right wrench among your Mossberg stock.

The Mossberg reputation for strength and service helps you to make your sales—it builds your business.

Write for complete 1920 catalog



No. 45 Socket Wrench Set

WALTER I. TUTTLE, *President and General Manager.*

FRANK T. CHASE, *Treasurer and Sales Manager.*

EVERETT L. FORD, *Secretary and Superintendent.*

FRANK MOSSBERG COMPANY

WRENCHSMITHS

LAMB ATTERROAD

FOR 20 YEARS

ATLANTIC CITY, N. J.

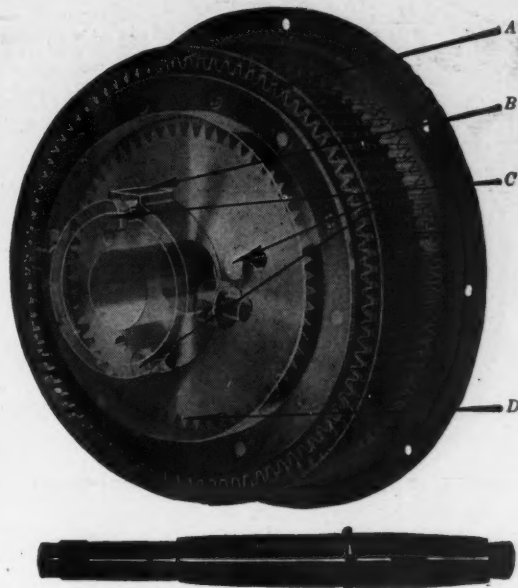
**The Velvet
Clutch**

**With the Bull-
Dog Grip**



For Every Automotive Need

There is a Detlaff multiple disc clutch of the right size for any automotive need, in car, truck or tractor. All are of the gear-tooth type, and have the specially designed self-compensating springs and the treated facings that give the Detlaff clutch a freedom from frequent adjustment and a smoothness of action that spells complete satisfaction.



- A, D—Gear-tooth drive on all discs
- B—Lubrication from any convenient point
- C—Long, easy springs compensate automatically for facing wear

Detlaff clutches will be shown at the National Tractor and Implement Show at Columbus, Ohio. We will gladly send complimentary tickets on the request of interested visitors.

A. J. Detlaff Company, 124 Lafayette Ave., East, Detroit, Mich.

96 Ninth St., San Francisco

2 Columbus Circle, New York

202 Chamber of Commerce, Indianapolis

(51)

WOLVERINE

1 1/2 and 2 TON TRUCKS

The Winning Sales Argument

The trump argument that wins sales for the Wolverine Dealer is the very same point that wins us dealers, viz: The triumphant record of Wolverine truck performance.

We want to show you just how completely this mechanically perfect truck has been satisfying dealers and their customers over a continuous stretch of years. We want to submit to you the proof that this brute of a truck operates at a lower cost per ton-mile than you ever knew before.

In cold black and white, we want to present you with the figures that prove the Wolverine is the unusually profitable proposition we claim for it.

Send for the Proof—NOW!

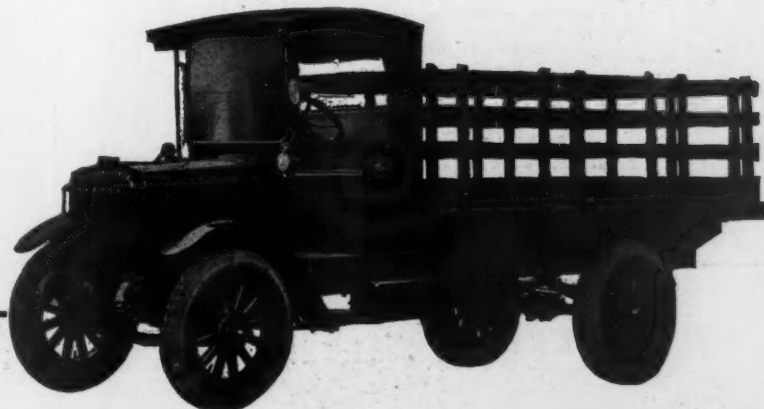
The American Commercial Car Co.

Gratiot Ave. and Detroit Term. R. R.

Detroit, Michigan

Approved Units

Rugged Continental Motor that supplies abundant power at least cost. Dependable Lighting and Ignition System. Special Wolverine Cast Shell Radiator. Powerful Russel Internal-Gear Drive Axle. Heavy drop-forged front axle, equipt with Timken bearings. Irreversible worm and gear Steering Gear. Selected heavy 5" Steel Channel Section Frame. Heavy-duty artillery-type wheels. Wheel-base, 140".



MASTER OF TRACTION



Have Your Arrow Grips Ready

Arrow Grip Non-Skid Chains are sold to prevent truck tie-ups, road delays and towing charges and should therefore be in the tool-box ready for instant use when needed.

Don't wait until your driver telephones in for help. Equip him with Arrow Grips now and he will be able to meet any emergency. He may need them on his next trip.

Arrow Grips possess the greatest strength and simplicity. Attached or detached in a few minutes without trouble or labor. Consist only of a clamp and the cross chain. Pass chain around tire, place ends on hooks of clamp and press down latch. Should a cross chain be broken, any standard chain may be used to replace it.

We will send complete illustrated literature and our liberal discount proposition to dealers on request

Write Us Today

The Arrow Grip Mfg. Co., Inc.

Glens Falls New York

Export Office, Room 125, 280 Broadway, New York City

SHOW SPACES

New York: D 52

Chicago: 5, First Regiment Armory



WARNER

HEAVY DUTY

TRUCK TRAILERS

TWO AND FOUR WHEEL TYPES

FOR every trucking need there is a Warner Trailer to make every truck more profitable. Warner Trailers shoulder the lion's share of the load. Built on the best truck construction principles to stand up under the hardest service with the best trucks.

Owners of light trucks will be interested in the Warner Model S-5, an extremely practical proposition that will handle a load of better than 4,000 lbs. Equipped with pneumatic tires. This Warner Trailer and a $\frac{3}{4}$ to 1 ton Truck creates practically a two-ton truck at a very low investment figure.

A handy and economical hauling unit for merchant, manufacturer or farmer. Write for literature and full information on how to halve hauling costs.

The Warner Mfg. Co.
23 Main St., Beloit, Wis.





STEEL CASTINGS

Every casting from our foundries embodies the utmost in steel casting quality—strength, flawlessness, true to pattern, electrically annealed, clean, and rigidly inspected.

That is why so many truck manufacturers continue to use OHIO steel for parts which must stand up under the hardest strain.

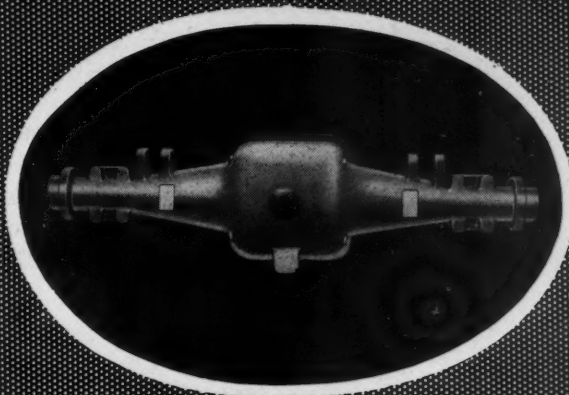
We look beyond the casting itself, and visualize the use for which it is designed. We know what machining is required when it reaches the plant of the manufacturer. And we know the service that is expected of the casting when it is placed on the truck.

Thus our foundry methods become an integral part of your production system, and the casting itself a dependable unit in your finished product.

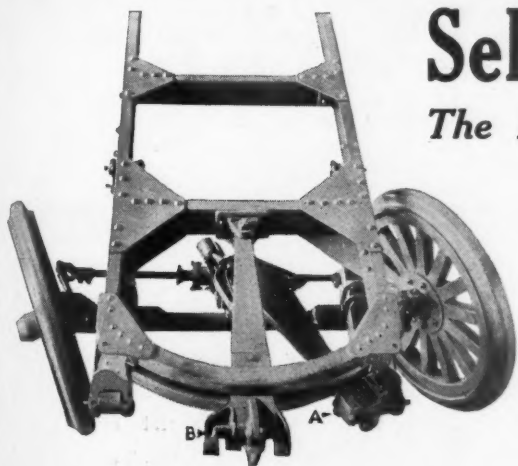
THE OHIO STEEL FOUNDRY COMPANY

Springfield, Ohio

Larger castings made in our plants at Lima and Bucyrus, Ohio



Rear Axle Housing for the Ahrens-Fox Fire Engine Company, Cincinnati, Ohio



This Steering Mechanism is Exclusive BYRON Construction

The independent steering arm (A) connects the steering gear to drawhead (B) or to frame, as required, and permits the BYRON TRAILER to be steered by hand independent of drawbar, whether going forward or back. This is a great saver of time and effort in maneuvering the trailer, as it eliminates necessity of uncoupling trailer to direct the steering.

Sell BYRON TRAILERS

The Line That Offers Unusual Opportunities

BYRON TRAILERS have advantages in easy steering, safe operation and efficient handling that cannot be found in any other trailer, because the mechanism that gives these advantages is exclusive, patented BYRON construction. BYRON TRAILERS are easier to sell. They are sturdily built to withstand hard, constant service, and give complete satisfaction. Moreover, the BYRON selling policy allows the dealer a very liberal margin of profit. Sold in pole trailer, semi-trailer and 4 wheel reversible types.

Write for Our Dealer Proposition and Information About Territory

BYRON ENGINEERING WORKS, INC.

General Offices and Factory Louisville, Kentucky

Factory Representatives:

CHICAGO	DETROIT	ST. LOUIS	NEW ORLEANS	JACKSONVILLE, FLA.
2959 Indiana Avenue	1685 Gratiot Avenue	201 S. 10th Street	1621 St. Charles Avenue	206 East Forsyth Street

VERTICAL or OBLIQUE HYDRAULIC HOIST

Occupies Only 14" Behind Driver

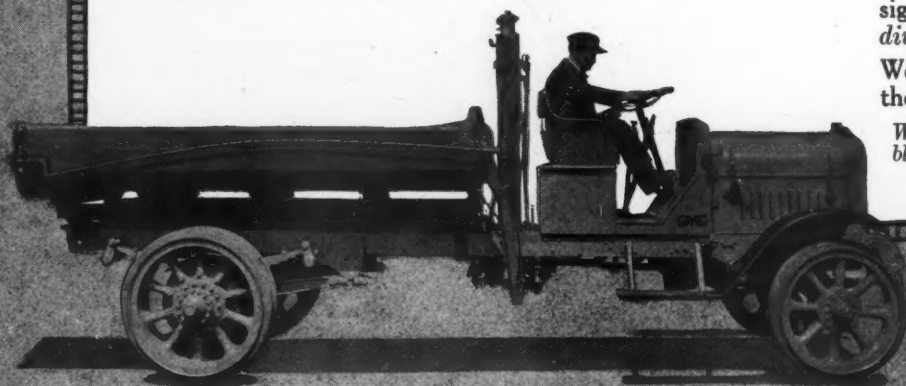
And it takes the driver only 30 seconds to dump a 5 ton load. That is to say, he is on his way for another load in one-half minute instead of consuming 40 minutes unloading, as he otherwise would—while the truck stood idle.

What's the reason for the Hydraulic Hoist's exceptional efficiency?

For one thing, the Hydraulic Hoist for your truck is specially designed to fit *your individual chassis*.

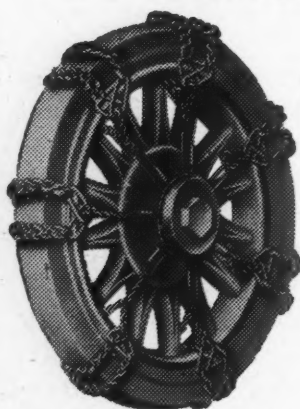
Would you like to hear the other reasons?

Write—and send us your blueprints.



HYDRAULIC HOIST
MFG. COMPANY.
292 WALNUT STREET
ST. PAUL, MINN.

DAUBENSPECK *DubL-Bilt*



Single-Unit Non-Skid Truck Chains

These Chains *get the business* and that is one thing every dealer must think about. There is no money in having shelves loaded

up with a lot of "dead ones." Our Chains get the business because they give truck owners and drivers what they want. One unit, or as many units as may be needed, can be put on *without jacking up the load*. Chains can't roll, lock or cut tires. Strong enough to hold under all conditions of road and load.

Write for Our Dealers' Proposition

DAUBENSPECK CHAIN COMPANY
Butler, Pennsylvania

Parker

TRUCKS

Higher Standard in Material, Construction and Finish—Guaranteed for Indefinite Time and Miles—Parker Trucks, 2, 3½ and 5 Ton, are the most reliable on the market today, for both the user and dealer alike.

WRITE NOW FOR DEALERSHIP DETAILS

Parker MOTOR TRUCK **Company**
MILWAUKEE WISCONSIN

An Explanation

Uncertainty exists in some quarters regarding the connection between the SIMPLEX "FOUR-in-ONE" BODY and HAND HOIST, and the DAILEY "FOUR-in-ONE" BODY and HAND HOIST.

The so-called DAILEY "FOUR-in-ONE" BODY and HAND HOIST has always been manufactured by the SIMPLEX MFG. COMPANY, at Conneautville, Pa., H. R. Dailey acting merely as selling agent for the Company, and, in some of his advertising, applying his own name to our product.

To prevent further confusion, these bodies and hoists will, in future, be known ONLY AS SIMPLEX "FOUR-in-ONE" BODIES and HOISTS.

You will help avoid misunderstanding by specifying "SIMPLEX"

THE SIMPLEX MANUFACTURING CO.
CONNEAUTVILLE, PA.

All Gauges of COLD ROLLED STRIP STEEL

For Immediate Delivery

THE Hogan warehouse contains a heavy stock of all popular gauges of cold rolled strip steel such as .032, .035, .042, .050, .058, .062, .065, .095, .125 and .187, mostly in widths wider than 12", all 6' lengths.

There is also at the present time a moderate quantity of the other gauges starting with .010 and up to .375, in a number of narrow as well as wide sizes.

*This steel can be shipped the same
day your order is received*

JOHN R. HOGAN COMPANY
Alloy Carbon and Cold Finished Steels
Westmoreland, Cedar, Chatham and Madison Streets, Philadelphia, Penna.





Specialists in
CHEVROLET, MAXWELL
Drive Gears and Pinions

for
Repair and Replacement

ACCURATE — RELIABLE — QUIET

Weekes-Hoffman replacement gears and pinions are made from alloy steels specified for gear purposes by the Society of Automotive Engineers, thus assuring materials of exceptional density and toughness. All gears and pinions machine finished, with bores accurately ground. Heat treated and tested for operation and endurance.

Chevrolet and Maxwell repairs and replacements in standard ratios.

Every garage and repair shop needs these in stock.

*Write for complete details
and attractive proposition*

Weekes - Hoffman Co.

Syracuse, New York

U. S. A.

Cable Address: "WEHOFFCO" Code: Western Union

Converting Reo Speed Wagons Into Three-Ton Trucks

with Detroit Universal Truck Attachments, has been a source of additional profit to many Reo dealers.

Advantages of the converted Speed Wagon over the ordinary 3 ton truck include lower price, greater speed, lower consumption of gas and oil, quicker response to controls, and greater horsepower per hundred pounds than any other truck on the market.



Here is a money-making proposition for Reo dealers. Write for specifications of Detroit Universal Truck Attachments.

CARRIER MOTOR TRUCK CO.

1685 Gratiot Ave.

Detroit, Mich.

NATIONAL HAND HOISTS

Speed With Ease

LIGHT STRONG COMPACT

3 Ton Capacity

The movable pulley and drum does away with parts extending above or below truck body.

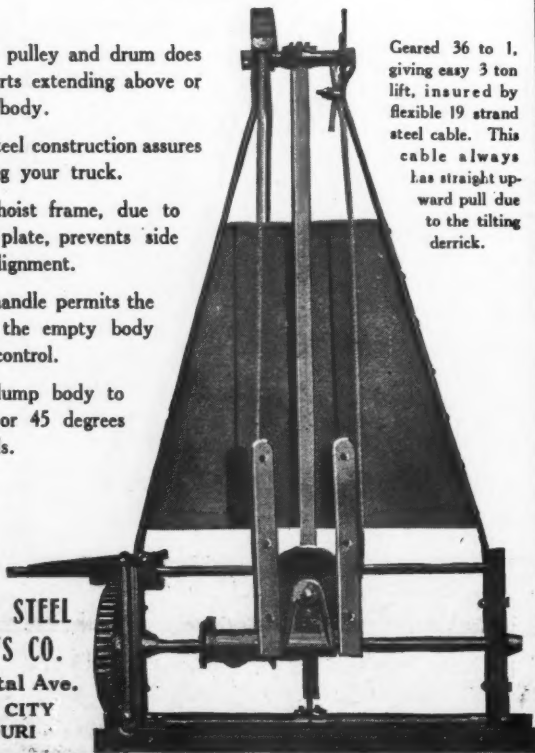
The sturdy steel construction assures its outwearing your truck.

Rigidity of hoist frame, due to heavy steel plate, prevents side play or mis-alignment.

Brake lever handle permits the dropping of the empty body with perfect control.

Will raise dump body to angle of 40 or 45 degrees in 40 seconds.

Geared 36 to 1, giving easy 3 ton lift, insured by flexible 19 strand steel cable. This cable always has straight upward pull due to the tilting derrick.



**NATIONAL STEEL
PRODUCTS CO.**

1611 Crystal Ave.
KANSAS CITY
MISSOURI

Wheels and Rims

For PNEUMATIC TRUCK TIRES



We furnish promptly, any sizes from 32 x 4½ inches to 42 x 9 inches and to fit the hubs of any make of truck.

Send for Price List D

LUVERNE MOTOR TRUCK COMPANY
LUVERNE MINNESOTA

Manufacturers of TRUCK PARTS

S-M-C**Asbestos
Brake Lining****Generated Brake Heat is Really Cool**

Compared to the heat S-M-C has already come through. Heat units higher than any it meets in actual brake service are necessary to fix our Special Impregnating Compound.

That's why S-M-C resists heat so successfully. It must meet its supreme heat test *before* it leaves the factory.

Generated brake heat alone will burn up or crumble linings that must meet their tests *after* they are on your customer's car. Sell them instead S-M-C—the World's Famous Solid-woven Asbestos Brake Lining.

STAYBESTOS MFG. CO.

5523 Lena Street

Philadelphia, Pa.

The Modern Factory, devoted exclusively to the manufacture of brake and transmission linings

**DENBY
MOTOR TRUCKS**

IN those kinds of hauling where roads and loads and weather conspire to destroy a truck in its very prime, Denby lasts and *lasts* and *LASTS!*

Denby Motor Truck Co.
Detroit, Mich.



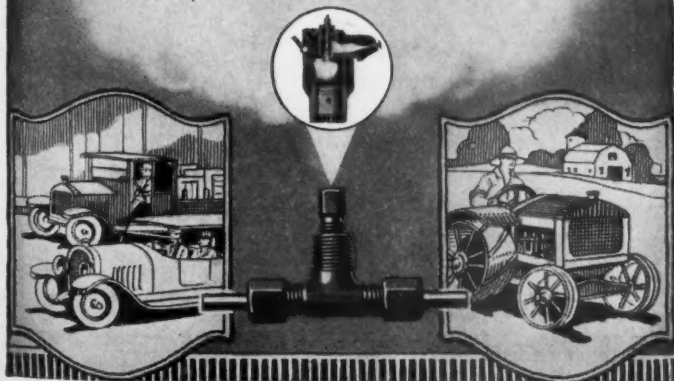
DENBY MOTOR TRUCK CO
DETROIT, MICHIGAN

**JORGENSEN
VAPOR PRIMER**

COLD weather brings increased starting troubles. Motors turn over harder, lubricants are stiff and heavy. Present day gasoline will not vaporize easily at low temperatures. Storage batteries are only 50% efficient and doubly overtaxed by excessive spinning to get the motor running.

Equipped with the Jorgensen Vapor Primer, a highly vaporized charge of gasoline is injected into each cylinder that ignites at the first or second quarter turn of the motor. Temperature or grade of fuel does not bother the motor-wise owner who has equipped his car or truck with this efficient device.

The Jorgensen Mfg. Co.
Waupaca, Wisconsin

**Eco
Numethod
CONCENTRIC
PISTON RINGS****CONCENTRIC ONE-PIECE RINGS**

machined by a new method from high-grade individual castings. They fit shallow grooves accurately and expand with uniform radial pressure. They maintain motor compression to the maximum point.

Send
for our
Booklet

ECO MFG. CO.
53 State St.
Boston Mass.

Ring
Specialists
for
Ten Years

United States Motor Trucks

FLOATING POWER PLANT

"As Good as the Name"

Seven models—five worm drive
—two with Clark Axles—1½ to
6 tons capacity.

The United States Motor Truck Company

Incorporated

Cincinnati

Ohio



SIDE VIEW

Dumps a 3 Yard Load in 1½ Minutes

That's the kind of demonstration of the Automatic Side-Dump Body that convinces.

Show your prospects further that it dumps in any weather; can't get out of order; occupies all available space back of driver's seat; dumps all the load off without operating truck; fits any chassis.

Outwears any truck. Its many valuable time and labor-saving advantages emphatically influence customers to buy your trucks equipped with Side-Dump Bodies. Write for interesting dealer proposition.

AUTOMATIC DUMP CAR COMPANY

Sales Department 7

1603 Ernsperger St.

South Bend, Ind.

Automatic Side-Dump Body

SERVICE

Duplex-Simplex

Double drive Single drive

GOVERNORS

STATION

Your Trucks
Should be
DUPLEX
Equipped

1. They will last longer.
2. Keep out of the repair shop.
3. Keep on the job.
4. Make better average time.
5. Deliver more goods at less expense.
6. Use less gas and oil.
7. Competitive tests prove this

Equip your trucks with **DUPLEX**
Specify **DUPLEX** when ordering
new trucks

**THE DUPLEX ENGINE
GOVERNOR CO., Inc.**
56 Flatbush Ave. Ext., Brooklyn, N. Y.

Branches in Chicago and
Detroit

Service stations in all
principal cities

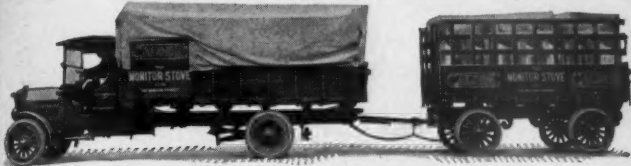
ADAMS AXLES

Represent Advanced Thought in Axle Construction

Adams Axle Company
Findlay, Ohio

Detroit Office: 1401 Kresge Building
W. D. Rockwell, Mgr.

A



Power for Bad Hills With a Full Load and a Trailer!

THREE Schacht Trucks with ten-speed transmission—two of which pull Trailers—have made a remarkable record in the service of the Monitor Stove Company, of Cincinnati.

The two 3½ ton trucks are equipped with removable bodies—three bodies for two trucks. One truck leaves the extra body at the plant and it is loaded before the other comes in. An extra trailer is loaded in the same way.

The greater speed at which the Schacht Trucks with ten-speed transmission enable a load to be taken through under all sorts of conditions, and the efficient modern way in which these trucks are used have resulted in a very low cost of operation.

*Write for the facts about this remarkable truck
It offers a tremendous dealer opportunity*

The G. A. Schacht Motor Truck Company

CINCINNATI, OHIO

BRANCHES: NEW YORK AND CHICAGO

Export Department: 237 Hancock Street, Long Island City

Schacht WORM DRIVE Motor Trucks

THE
GENERAL
CORD TRUCK TIRE

—Goes a long way
to make friends

Built in Akron, Ohio, by
The General Tire and Rubber Company

Now and Always
Completely Equipped

OSHKOSH 4-Wheel-Drive Truck

Hauls heavy average
“pay loads” because
designed for pneumatics

Oshkosh Motor Truck Mfg. Co.
Oshkosh Wisconsin

COUNTERBALANCED PARK CRANKSHAFTS

Patented July 10, 1917



We have
shipped 118,260
Counterbalanced
Crankshafts up to
December 2, 1920

**THE PARK
DROP FORGE
COMPANY**
Cleveland, Ohio



DIETZ LAMPS

DIETZ "CHAMPION"

A Better Motor Truck Lamp
Burns Kerosene

Height, 11½ inches. 16 C. Power. Burns 14 hours on one filling of oil. Black Enamel Finish. Nonlosable Oil Fount.

Further Particulars Mailed on Request

R. E. DIETZ COMPANY
60 Laight Street New York
Founded 1840

JAMES BARNES, Sales Manager
Motor Truck Lamp Dept.
CARTER BUILDING, Rochester, N. Y.



In Service—

The dependable ability to deposit any load exactly where it is wanted is one of the reasons for the popularity of **HORIZONTAL HYDRAULIC Dumping Units.**

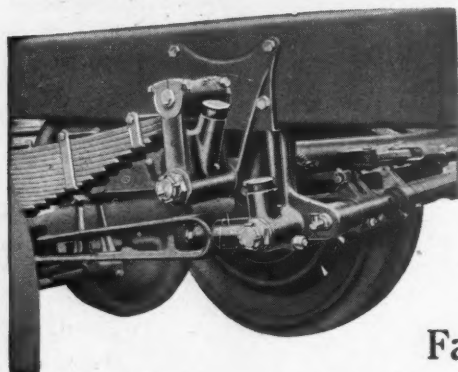
HORIZONTAL HYDRAULIC HOIST CO.

31-37 Twenty-fifth St. Milwaukee, Wis.

Sales and Service Stations:

Chicago, Ill. 3755 Wentworth Ave.

Detroit, Mich. 605 Gratiot Ave.



The Old-Fashioned Wick System Fills a New-Fashioned Need

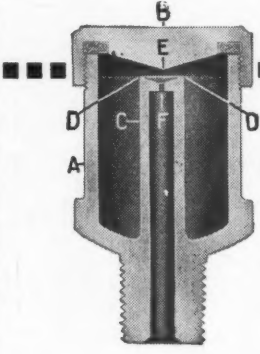
DEVELOPED from the principle of a wick in an oil lamp, the automatic lubrication of the *Ward La France Motor Truck* is the most advanced system of lubrication ever devised. The oil is supplied to the Spring Shackles, Radius Rods, the Brake Mechanism and Drag Link Assembly just as it is needed. None is wasted—it cannot cake like grease and lubrication does not flow when the truck is idle, which is a saving. It will remain lubricated without refilling longer than any other truck on the market.

This Exclusive Lubrication System is a big aid in selling. Send for full particulars about Dealerships.

Model 2B....2½ ton....\$3590.00
Model 4A....3½ ton....4490.00
Model 5A....5 ton....5490.00

Ward La France Truck Corp.
Elmira, New York, U. S. A.

Desk 13

Note Simplicity of Construction
No Moving Parts

Sell Scientific Lubrication

Sell your customers scientific efficient *oil* lubrication. Eliminate grease—which allows grit and dirt to ruin bearings.

BLOOMING CUPS

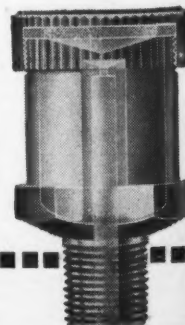
automatically flush, clean and lubricate bearings with oil. One filling enough for 1000 to 3000 miles.

DEALERS

You make quick profits on these self-feeding friction eliminators. Write for Attractive Proposition.

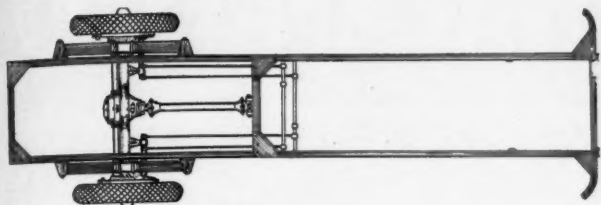
Chas. S. Monson
Sales Department
2113 Dime Bank Building
Detroit, Mich.

Manufactured by
Bloom Flusher Co. Tiffin, Ohio



LUVERNE TRUCK UNITS

ONE-TON TO THREE-TON CAPACITY



Model BB Full Frame Unit

REAR END UNITS

For converting passenger cars into trucks

FRONT END UNITS

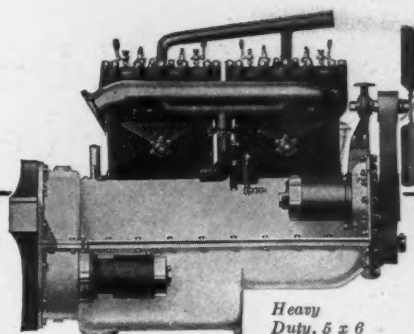
For combining with used rear-end units

**BODIES, CABS, WHEELS AND
MOTORS, TO FIT ANY
MAKE OF TRUCK**

Send for **TRUCK UNIT PRICE LIST** and
AGENCY PROPOSITION

LUVERNE MOTOR TRUCK CO.

LUVERNE, MINN.



Heavy
Duty, 5 x 6

For Real Motor Economy

Builders of better trucks and tractors are specifying the higher priced Wisconsin because they know that its better workmanship makes it more economical in the long run. Lower priced motors are cheap only on the basis of first cost. "Standing the gaff" of hard service makes them expensive.

Every Wisconsin Motor is run-in, torn down, rigidly inspected and re-adjusted before it is reassembled. Each is power-tested by an electric dynamometer. Dealers profit by the saving in service.

Wisconsin Motor Mfg. Co.

Sta. A, Dept. 320

Milwaukee Wisconsin

DISTRIBUTORS:

New York Branch: T. M. Fenner, Factory Representative, 21 Park Row, New York City.

California Distributor: Earl P. Cooper Co., Los Angeles, Cal.

Northwest Distributor: Chandler-Dunlap Co., Seattle, Wash.



Connecting Rods

are of the I-beam section type, drop-forged of 35% carbon steel, heat-treated and fitted with babbitt-lined bronze bearings on the crankshaft end.

Wisconsin
CONSISTENT
MOTORS

WOOD
DETROIT

**HYDRAULIC HOISTS
and STEEL
DUMPING BODIES**

Manufactured by

**WOOD HYDRAULIC HOIST &
BODY COMPANY**

Main Factory

1026 Bellevue Ave., Detroit, Michigan

Branches

NEW YORK
721 E. 135th St.

CHICAGO
2911 Indiana Ave.

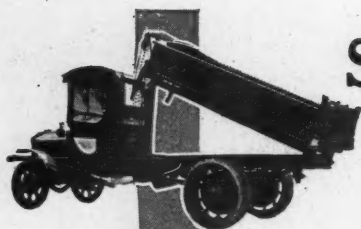
SAN FRANCISCO
441 Folsom St.

The **LAW of
LUBRICATION**

**FOR EVERY MACHINE, of
EVERY DEGREE of WEAR there
is A SCIENTIFIC SINCLAIR
OIL to SUIT its SPEED AND
CONSERVE its POWER.**

Sinclair Refining Co. Chicago





Steel Dump Bodies

Your Dump Body requirements handled by specialists. Standardized models—or made precisely to your specifications.



Truck Radiator Guards

You effect greater distribution when your truck is Stewart Radiator-Guard Equipped. Our Engineering Department will be glad to advise you whether flat bars, channel or angle sections be used.

We can also efficiently supply your steel cab and steel dash needs. Write.

The Stewart Iron Works, Inc.
Cincinnati Ohio

STEWART SPECIALTIES

Tanks and Other Quality A.B.&B. Sheet Metal Parts

For Quality Trucks

The grinding wear of daily truck operation speedily searches out the weak spots in your truck assembly.

Your Tanks, Hoods and Fenders will always be the *strong* parts if they are made by the A. B. & B. Sheet Metal Works—

Because Our Years of Experience Have Taught Us How

And they will retain their style and handsome appearance indefinitely.

May we show you samples of stock accompanied by our estimates? Send us your blueprints.



A. B. & B. Sheet Metal Works

CHAS. STOLPER, President

Fond du Lac Ave. and 33d St.
Milwaukee Wisconsin

THE HAND MADE TRUCK

KALAMAZOO

1½-2½-3½ Tons Capacity



An opportunity for distributors capable of handling a high-grade motor truck of proven merit.

Write for particulars covering territorial rights, etc.

Kalamazoo Motors Corporation

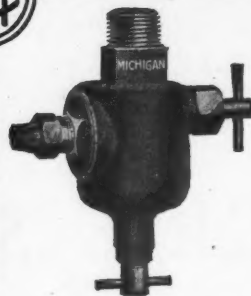
(MOTOR TRUCK DIVISION)

Kalamazoo, Mich.

U. S. A.



THE GUARANTEED KIND



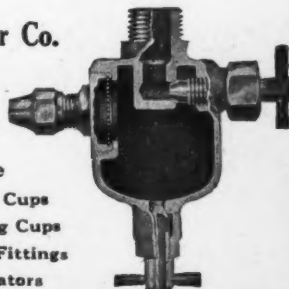
Mr. Truck Maker

Keep the dirt and water from the carburetor by using

Michigan Sediment Traps

1. Screw it into the gasoline tank.
2. The bowl traps the water.
3. The strainer gets the dirt.
4. Clean gasoline goes to the carburetor.
5. The needle valve shuts it off tight.

Michigan Lubricator Co.
Detroit, Mich.



Part of Our Line

Air Cocks	Grease Cups
Drain Cocks	Priming Cups
Gasoline Cocks	S.A.E. Fittings
Oil Cups	Lubricators

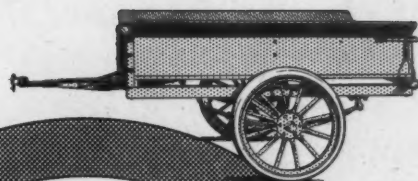
MADE BY MICHIGAN LUBRICATOR CO. DETROIT.

FEDERAL dealers are selling their quotas irrespective of industrial and financial conditions affecting others.

There's a good reason for this. Ask them—or us.

FEDERAL MOTOR CAR COMPANY
DETROIT, MICHIGAN

Another
FEDERAL

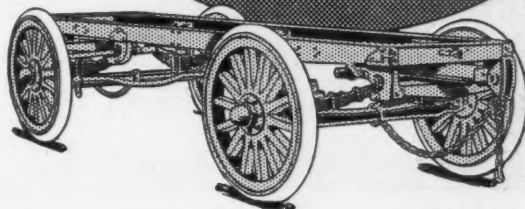


Farmers need trailers. Stockmen need trailers. Merchants in every line of business need trailers. Industrial concerns need trailers. The business is ready and waiting for every dealer who goes after it and goes after it right.

OHIO TRAILERS

The Ohio Trailer Dealers' Proposition will prove of more than ordinary interest. Write or wire for it today.

The Ohio
Motor Vehicle Company
Nottingham Road Cleveland



IRON CITY
Springs

have earned their present prestige and sound reputation as a result of dependable service and performance. Truck makers who include them in their assemblies know that they can place the full measure of responsibility upon them.

Iron City Spring Company
Pittsburgh, Pa.

Factory Representative
THOMAS J. WETZEL
New York Detroit

Pyrometrically controlled heat treatment and thorough testing assure dependable performance. Let us quote on your needs

WIZARD
VALVELESS

Power-Driven Tire Pumps

Simplicity

Of Wizard design, eliminates all troublesome features of the valve type pumps with their multiplicity of parts and their necessary adjustments and repairs.

There are only three moving parts in the Wizard Pump and for its service-life no adjustments, renewals or repairs are necessary. A turn of the grease cup before starting is the only attention needed.

As equipment on your chassis it will end your tire inflation troubles, and day in and day out it will deliver maximum pressure even under the severest and most adverse conditions.

Immediate deliveries of all models. Literature sent upon request.

Sundstrom Manufacturing Co.

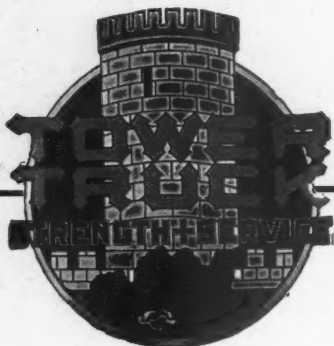
Successors to Rex Machine Co.

Shields Avenue at 32nd St.

Chicago, Ill.

Detroit Office, Garfield Building

"The Freight Car of the Highways"



Brute Strength

Brute Strength, Handling Ease and uninterrupted performance at uncommonly low ton-mile cost have made Tower Motor Trucks famous. Tower quality is measured by the efficiency of America's foremost engineers and has consistently received the enthusiastic indorsement of Distributors, Owners, and Drivers.

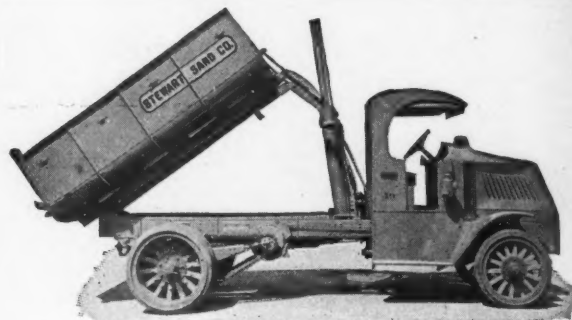
Built in 1½, 2½, 3½ and 5 Ton Models.

Write or wire at once for Dealer's Proposition

Direct Factory Branches

Minneapolis Chicago
Indianapolis Detroit

Tower Motor Truck Co.
Greenville Michigan



Big Sand Dealers

strongly recommend when they buy

Standard Steel Dump Bodies

because they are made on correct engineering principles by men with years of Body-building experience.

Write for circular No. 44 on Steel Dump Bodies and Hoists—or better yet—send specifications for estimates.

Standard Steel Works

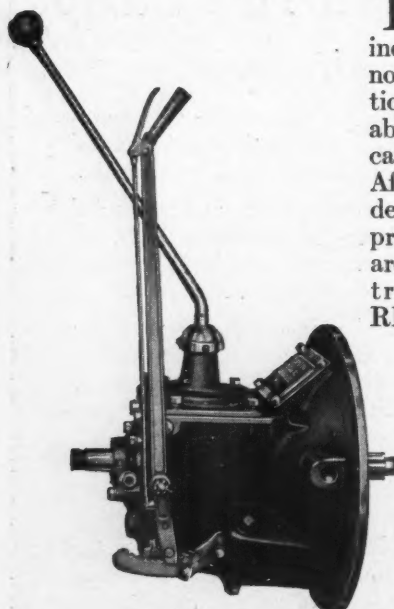
Successors to the Ell-Kay Mfg. Co.

1722 Tracy

Kansas City, Mo.

S. W. Distributors Woods Hydraulic Hoist
Made by Hydraulic Hoist Mfg. Co., St. Paul, Minn.

DURSTON TRANSMISSIONS



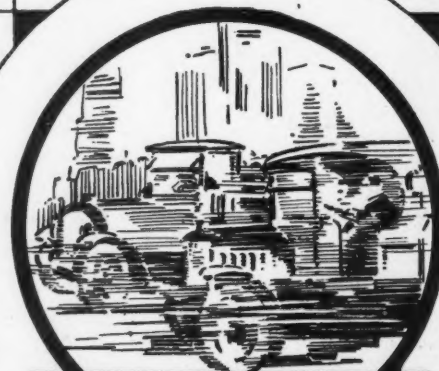
THE capacity of our factory has been greatly increased recently. We are now in very large production on transmissions suitable for trucks up to one-ton capacity or speed wagons. After years of effort in developing our designs and production methods, we are in a position to deliver transmissions that are RIGHT.

*We Solicit Your
Inquiries and
Consideration*

**DURSTON GEAR
CORPORATION**

SYRACUSE

N. Y.



TRUCK RACING

—Just Human Nature Unsuppressed

RACING is a lot of fun for the driver, but it's mighty expensive for the truck owner.

Over 100 truck manufacturers furnish Pierce Governors to prevent just this sort of abuse.

The Pierce Governor Company

"World's Largest Governor Builders"

Anderson, Indiana, U. S. A.



1½ Ton Worm-Drive Chassis, \$2150.00
 2 Ton Worm-Drive Chassis, \$2600.00

Buda Motor Brown-Lipe Clutch
 Bosch Magneto Timken Worm Drive
 Brown-Lipe Transmission
 Timken Bearings Throughout

This high-grade Transmission and Power Plant is mounted on a chassis exceedingly well designed and very substantial.

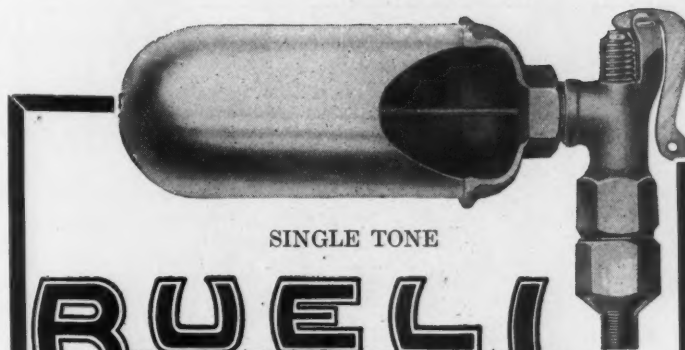
You will find this a profitable line to handle.

The durability and efficiency of these trucks enable you to secure your customers' repeat orders and build up a clientele of satisfied users.

Sullivan Motor Truck Corporation
 Rochester, N. Y.

FOR giving maximum mileage and the greatest measure of protection to loaded trucks, Fisk Truck Tires are unsurpassed. They save money for you.

FISK
TRUCK TIRES



SINGLE TONE

BUELL
 EXPLOSION WHISTLE
WARNS EVERY TIME

THE hard exactions of truck service strikingly prove the efficiency and economy of the Buell Explosion Whistle. For single unit or fleet of trucks the Buell gives unequalled satisfaction.

Buell operation is certain operation. Guaranteed for ten years. It is the only warning signal for motor cars and trucks approved by the Underwriters' Laboratories.

BUELL MANUFACTURING COMPANY
 Cottage Grove at 30th CHICAGO

CURTIS CLUTCH DISCS

CURTIS Steel Clutch Discs are furnished in high carbon or soft steel, plain or slotted, flat or formed, unfinished or ground and polished, tempered or untempered—any size.

CURTIS CLUTCH DISC COMPANY
 1835 Kienlen Ave.
 St. Louis Missouri



Steel Cabs for Greater Service

A complete line of open seats and dashes, semi-closed and fully closed cabs for motor trucks, in steel construction of the highest standard.

Sheet Steel Products Co.

MICHIGAN CITY, IND.



Built By
**MUSKEGON
MOTOR
SPECIALTIES
COMPANY**
MUSKEGON,
MICHIGAN.

By Reputation - "The Best Cam Shafts Made"

Dart

MOTOR TRUCKS

The "Blue J" Tractor



Dart Truck AND Tractor Corp.

WATERLOO, IOWA

STANDARD UNIVERSAL JOINTS

**Made in Our Own
Drop Forge Plant**

This means: Closest kind of supervision all along the line from rough bar to finished product. Further, it means we gladly assume full responsibility for the operating efficiency of this quality Universal in your truck assembly.

Let us tell you the inside story why the U. S. Government selected this high-grade Universal as standard equipment for its Aviation, Signal Corps and Double "A" Trucks. *Write.*

The Universal Machine Company

430 Ridge Street
Bowling Green
Ohio



KISSEL Custom-Built Six

*"The Aristocrats
of Motordom"*

6 Models—3 Open and 3 Closed

KISSEL Motor Trucks 4 Sizes

Equipped with Kissel's
ALL-YEAR Cab for Trucks

Distributors in Principal Cities
Open Territory Now Being Closed

*The
ALL-YEAR
Car*

Kissel Motor
Car Co.

Hartford, Wis.
U. S. A.

Do You Know Your Repair Job Costs?



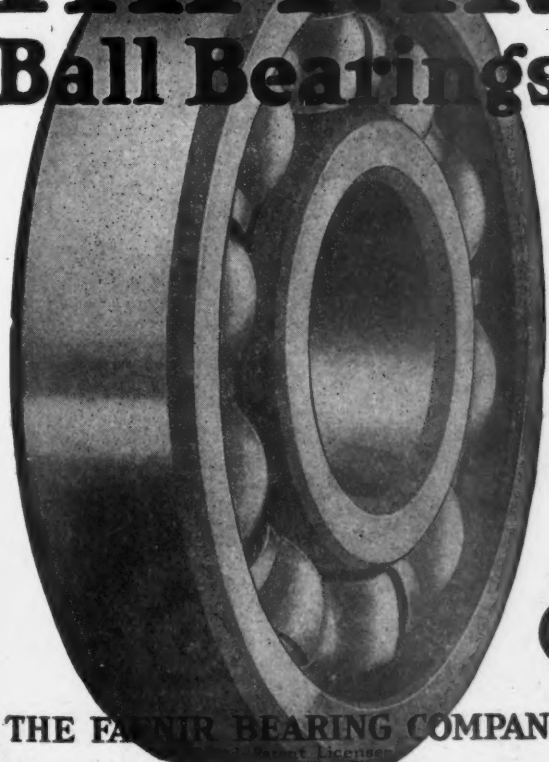
Think! How many of last year's customers still give you their repair jobs? If you had been able to show them every time, the *complete record of each job*, wouldn't you still be holding practically all of that trade? Of course you would!

Install a Calculagraph and time every job accurately to the minute. It records the actual time elapsed on all jobs and will prove to your customers that you know your costs—that your charges are fair. We issue a booklet outlining a simple Time and Cost Keeping System. It is free and will be sent upon request.

THE CALCULAGRAPH COMPANY, Dept. 12
30 Church Street, New York City

The **CALCULAGRAPH**
"The Elapsed Time Recorder"

FAFNIR Ball Bearings



THE FAFNIR BEARING COMPANY
New Britain, Conn.

DETROIT Office, 752 David Whitney Bldg. CHICAGO Office, 1301 Michigan Ave.
CLEVELAND Office, 916-917 Sweetland Bldg.



*Now is the Time
to Sell*

FOLEY TRACTION RIMS

Now—in the fall time—when motor truck users find the going mighty bad over soft, muddy roads.

Foley Traction Rims will save your customers valuable time—fuel—repair bills.

The broad rims and traction lugs take immediate hold when the rubber tires sink in the miry ground. Easily furnish positive, powerful traction—every time.

*Write for full particulars regarding
this big business building proposition*

FOLEY TRACTION RIM COMPANY
827 Hennepin Avenue Minneapolis, Minn.

Nash Quad Truck
Equipped With
FOLEY
TRACTION RIMS





REAL WORK

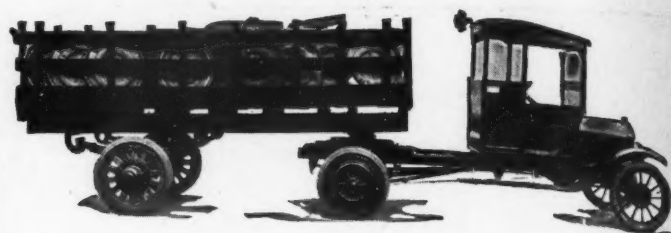
A big moving van rolling over all kinds of roads is the real test of a motor truck.

Harrison Bros., Toledo, Ohio, are expert movers and long distance freight handlers. They purchased their first Union four years ago and now have a fleet of Unions.

Our booklet "Experience" shows many records of performance which make Union repeat order sales so easy. It will be sent on request.

ASK ABOUT OUR AGENCY

UNION MOTOR TRUCK CO.
BAY CITY, MICHIGAN



King Trailers Help Sell Motor Trucks

By doubling the capacity of a motor truck, the King Trailer enables dealers to offer customers a haulage unit at greatly reduced cost.

A 5-ton King Trailer and a 2-ton truck cost only slightly more than half as much as a 5-ton truck—do the work of a 5-ton truck with an operation expense only 10 per cent greater than that of a 2-ton truck.

With an increased production, we are in position to enlarge our distributing organization. Write for our dealer proposition.

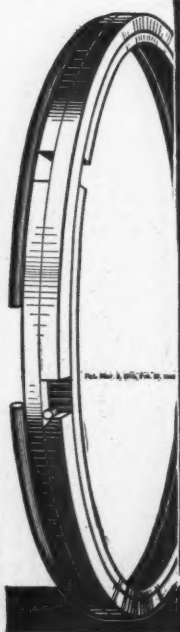
King Trailer Company

601 Main Street

Ann Arbor, Mich.

King Trailers
Decrease Your Hauling Expense~

TO SAVE OIL AND GAS



use PRESSURE PROOF RINGS

The expander forces the contact ring against the cylinder wall and also against one side of the ring groove with a constant, even pressure. The expander itself rests with equal pressure against the opposite side of the ring groove. No amount of compression can break this seal. The result is a definite saving of gasoline and oil, a motor that constantly gives greatly increased power and that does not over-oil or accumulate carbon.

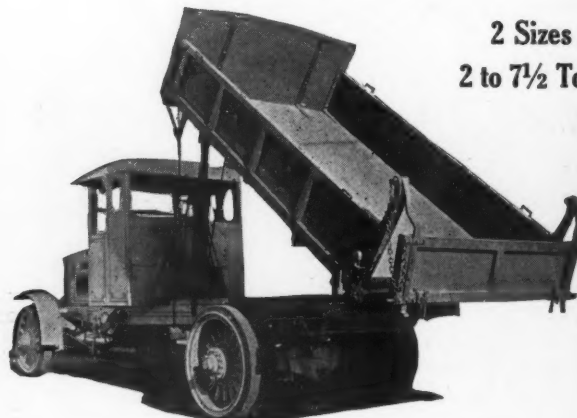
MANUFACTURED BY
PRESSURE PROOF PISTON RING CO.
107 HANCOCK STREET, BOSTON, MASS.
Solely responsible for the design and construction of the Pressure Proof Piston Ring.



Metropolitan Combination Dump Body

Immediate Delivery

2 Sizes
2 to 7½ Ton



Dollar for dollar you get more real value from a METROPOLITAN product than from others.

Our COMBINATION DUMP BODY is but one fitting example.

Write for Catalogue

METROPOLITAN BODY COMPANY
BRIDGEPORT, CONN.



Tell Their Own Service Story

Irrespective of exactions, Model B Joints transmit maximum motor power. Construction embodies:

Convenience of lubrication—the entire joint being lubricated through a single opening.

Oversize bearings positively lubricated with oil which is force fed by centrifugal action.

The elimination of companion flanges.

Completely supported bushings that eliminate loose play.

Drop-forged yokes in one piece, which afford brute strength.

A Request Brings Further Particulars

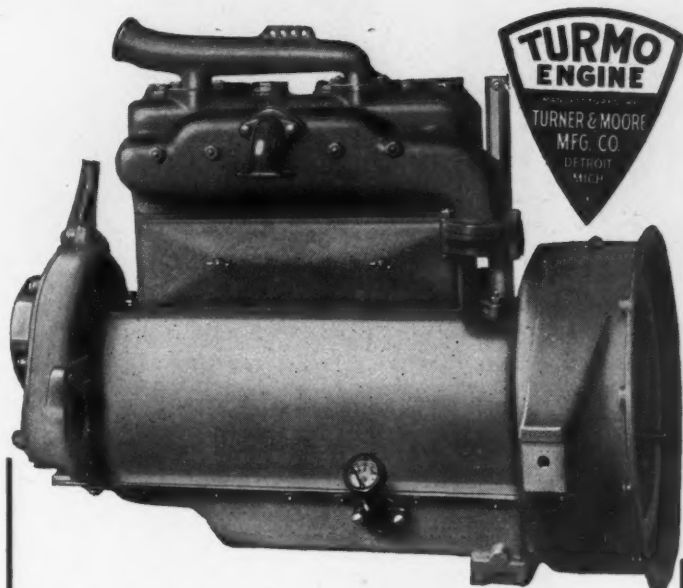
Blood-Bros. Machine Co.

Pioneer Builders of Universal Joints

Allegan

F. Somers Peterson Co.
San Francisco, California

Michigan



Turmo Four Cylinder Engines

Two Sizes: 3 in. x 5 in. and 3½ in. x 5 in.

Full pressure gear pump lubrication through hollow crankshaft to all bearings.

Highly efficient dry gas hot-spot manifold.

EXCELLENT THERMAL EFFICIENCY
S. A. E. STANDARD MOUNTINGS FOR ALL ACCESSORIES

Turner & Moore Mfg. Co.

32 Merritt Avenue

Detroit, Mich.

Quick Sales Satisfied Customers



Archer Steel Dump Body and Hand Hoist

For contractors. For grain men and coal men. For bulk deliveries of all kinds. This equipment speeds deliveries—only 2½ minutes to dump a 5-ton load. No upkeep expense—everlasting body. Write for prices and details.

ARCHER IRON WORKS

2442 W. 34th Place

Chicago

Makers of the Archer End-Discharging Concrete Mixer

TITAN

FIGURE IT OUT!

TITAN dealers averaged for 1920 to date 62½ repeat orders.

TITAN users to date average 2½ trucks a-piece.



"This record guarantees you"—All satisfied users—Many fleet owners and the final test—Low Selling Cost.

2½ Tons

3½ Tons

5-6 Tons

TITAN TRUCK CO.
MILWAUKEE WISCONSIN



Weatherproof

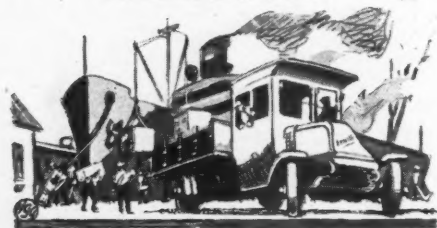
ALL SEASON

TOPS AND CABS

With the Patented Sliding Doors

AMPLE windows permit wide, all-around vision to truck drivers sheltered from the weather by Detroit Weatherproof Cabs. Send for data, literature and diagrams on these complete, ready-to-attach driving compartments for all styles and sizes of trucks.

DETROIT WEATHERPROOF BODY CO.
PONTIAC, MICHIGAN (2)



DETROIT TRAILERS



REVERSIBLE TRAILERS

For Motor Trucks and Tractors, also Pole, Semi- and Passenger Car Trailers.

Special dropped frame trailer with low gravity dump body for public work.

The best tracking and backing trailers in the market.

Take an agency and be happily prosperous.

Send for particulars

DETROIT TRAILER CO.

35 JOS. CAMPAU AVE.

DETROIT, MICHIGAN

Branch for Canada: Walkerville, Ont.

GRANT SPEED TRUCK

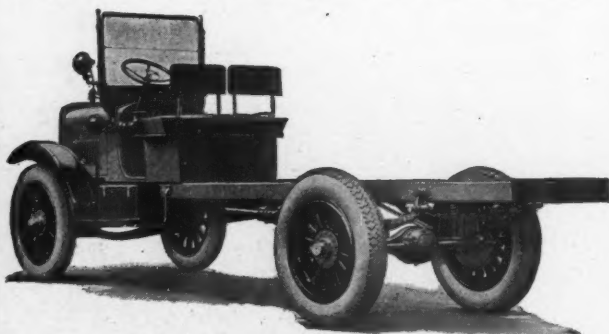
Model 17

1½-2 Tons

Electric Starting and Lighting
Complete Equipment

140 INCH WHEELBASE

FAST—ECONOMICAL—DEPENDABLE



GRANT MOTOR CAR CORPORATION
CLEVELAND

GET OUR NEW CATALOG "V"
SHOWING

BANTAM



USED ON THE BEST
MOTOR TRUCKS

THE BANTAM BALL BEARING CO.
BANTAM, CONN.

CHAMPION

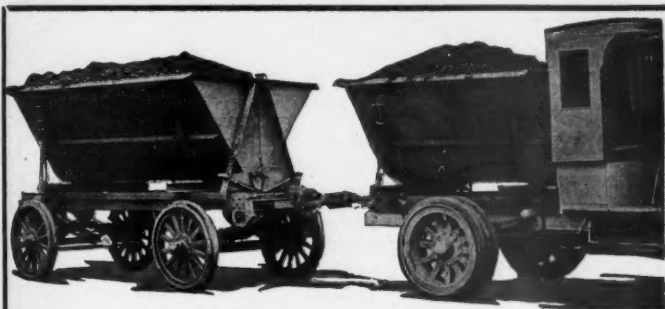


DROP FORGINGS

Keen competition demands the best quality. If drop forgings enter into the construction of your products, it will pay you to use the best, in other words—

CHAMPION DROP FORGINGS

The **Champion Machine & Forge Co.**
CLEVELAND, OHIO



Low Operating Cost

GRAVITY DUMP BODIES

Manufactured Under the Winsor Patents

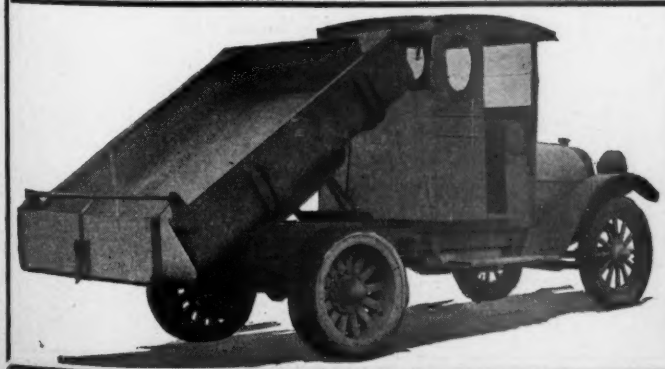
Let Us Estimate on Your Requirements

TRANSPORTATION EQUIPMENT CO., Inc.

Manufacturers—Transportation Engineers

7643 Gratiot Avenue

Detroit, Michigan



A LEAKY TANK is worse than useless—it's dangerous! Day after day it costs the motorist money in wasted fuel—and day after day it's inviting an explosion or fire.

Made of the finest seamless drawn steel—tested and proved—the "Jasco" Tank will not leak no matter how rough the service.

When you see a "Jasco" equipped car you'll know that the manufacturer believes in giving his customers the best. Send for booklet and detailed information.

We are prepared to handle contracts for deep drawn steel work. Send specifications.

Janney, Steinmetz & Company

Main Office, Philadelphia New York Office, Hudson Terminal Bldg.

Velie Ton and a Half

The Big Demand

Look at the truck market. The way trucks of the 1½-ton range are going, they will outsell all others combined. Velie Ton-and-a-half is built right, priced right—especially designed for the big market. Capable dealers are finding the Velie agency the most profitable asset. If your territory is not closed write for our liberal proposition. We can make immediate shipment.

VELIE MOTORS CORPORATION

Motor Truck Division

119 Velie Place

Moline, Illinois



90%

Of the automobile, truck, tractor and airplane engines made by American engine builders are factory equipped with laminated shims of

LAMINUM

LAMINATED SHIM COMPANY, Inc.
47 WEST 34th ST., NEW YORK

Chicago: 1118 S. Michigan Ave. Detroit: Dime Bank Building. St. Louis: Mazura Mfg. Co. England: R. A. Rothermel, 24-26 Maddox St., Regent St., London, W. I.

DEPENDABLE

The Better Truck to Sell

The DEPENDABLE Dealership is the most profitable long-time investment the dependable dealer can make. Maybe your territory is still open. Write.



BRIEF SPECIFICATIONS:

Buda Motor; Wisconsin Worm-Drive Axle; Dixie Magneto with Impulse Starter; Fuller Transmission; Long Radiators; Ross Steering Gear; Pierce Governor; Timken Bearings; Morse Viscometer.

Dependable Truck & Tractor Co.
Galesburg Illinois

Titeflex

REG. U.S. PAT. OFF

ALL-METAL TUBING

FLEXIBLE without sliding joints, TIGHT without packing



Enlarged section of Titeflex All-Metal tubing, showing detail construction. The diaphragm action of the convolutions produces flexibility.

We manufacture all of the INTERLOCKED types of tubing for Exhaust, Hot Air and Wire Covering.



Write for Literature

TITEFLEX METAL HOSE CORPORATION
Badger Ave. and Runyon Street Newark, N. J.

Increased Factory Facilities mean greater production and additional economy

The famous Walker Axle has so thoroughly demonstrated its superiority that the demand promises to outstrip the production capacity of the present plant. A new factory will, therefore, be erected at 87th and State Streets, Chicago, which will effectively solve the problem of building more axles and in addition will provide for the highest possible efficiency and economy in every manufacturing process from raw materials to finished product.

Walker Axle Company

General Offices: 72 West Adams St., Chicago, Ill.

Factory: East Chicago, Indiana

NAPOLEON Trucks

1 and 1½ Ton Capacity

Some of the
Reasons Why the
NAPOLEON
Sells "Big"—

Overhead Valve
Motor

Sturdy Double
Frame

Heavy Duty
Axle

A Real Clutch and
Transmission

"Safety-First"
Brake

All-Seasons Cab

**This is the Buyers' Market—
the Napoleon Will Stand the Test**

Today the buyer doesn't need to take a chance—he can know—he can and does demand exacting reasons—he buys on mechanical merit and on performance. Today, more than ever before, dealers realize that they must have a real truck to sell.

You can make some real money selling the Napoleon Truck in your territory because the Napoleon will stand critical inspection from the tip of its radiator to the tail light. If you are the right man to sell the Napoleon, write today for dealers' plan and complete literature. We are prepared to make prompt deliveries.

Napoleon Motors Company,
Traverse City, Michigan



Wyman-Gordon

Guaranteed Forgings

"STANDARD
OF THE
INDUSTRY"

WYMAN-GORDON

THE CRANKSHAFT MAKERS

Worcester, Mass.

Cleveland, Ohio

Chicago, Ill.

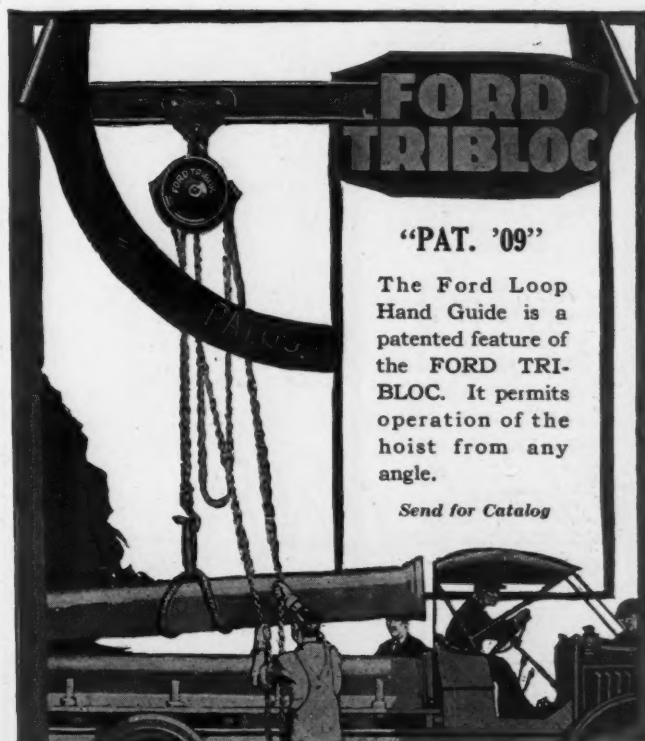
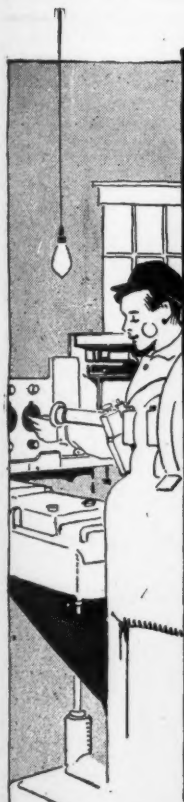
The Practical Mechanical Method of Repairing Old Cylinders

BY far, the majority of prominent automobile manufacturers finish their cylinder bores by grinding. They do this because the performance of their cars depends upon the accuracy used in manufacturing—and accuracy in finishing cylinder bores can be obtained only by grinding. Grinding insures smoothness of walls, perfect rounds and positive alignment of all bores because it places them all on a square with the base of the cylinder casting. For the same reasons cylinders should be *reground*.

Our large Regrinding Department, equipped with the latest special machinery and expertly manned, will give you regrinding service that you will appreciate.

MODERN ELECTRIC & MACHINE CO.
936-40 Fort Wayne Ave.
INDIANAPOLIS, INDIANA

**CYLINDER REGRINDING
and PISTON SERVICE**



**FORD
TRIBLOC**

"PAT. '09"

The Ford Loop Hand Guide is a patented feature of the FORD TRIBLOC. It permits operation of the hoist from any angle.

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2ND & DIAMOND STREETS PHILADELPHIA, PA.

OVER-SEAS REPRESENTATIVE

ALMACOA ALLIED MACHINERY COMPANY OF AMERICA
51 CHAMBERS ST. NEW YORK, U.S.A.

PARIS BRUSSELS TURIN BARCELONA RIO DE JANEIRO



**MODEL H
TRUCK TRANSMISSION
4 SPEEDS**

3 OR 4 POINT SUSPENSION
Amidship type, for 1½ to 3½ ton
trucks

Detroit Gear & Machine Co.
Detroit, Mich.

**GOES
ON
LIKE A HUB CAP**



**NO
DRILLING
NO
PINNING**

The Dreadnaught Indestructible Hub Odometer with Automatic Drive may be had at the following prices:

Ford and Maxwell model \$17.00
For all other motor vehicles \$20.00

Write for booklet and list of sales and service stations.

AMERICAN TAXIMETER CO.
20 West 61st Street New York, N. Y.

**MANUFACTURERS
AND
DEALERS**

**COMMERCIAL BODY
SERVICE**

Clark of Oshkosh
SERVICE QUALITY

BODIES AND CABS

ONE TON LINE—CATALOG 20
HEAVY LINE—CATALOG 21

WRITE FOR THEM

J. L. CLARK MFG. COMPANY
OSHKOSH, WIS.

**BRIDGEPORT
WORM DRIVE TRUCKS**

*Trustworthy, Dependable
Practical and Efficient*

Offering Three Models

1½ Ton Chassis	- - - - -	\$2350
2½ Ton Chassis	- - - - -	2850
4 Ton Chassis	- - - - -	3650

All Prices F.O.B. Bridgeport

*The ALL-WORK Truck Sold
at an ALL-POPULAR Price*

Bridgeport Motor Truck Company

Motor Truck Manufacturers
BRIDGEPORT CONNECTICUT





SNEAD

CUSHION DRIVE

SHAFTS

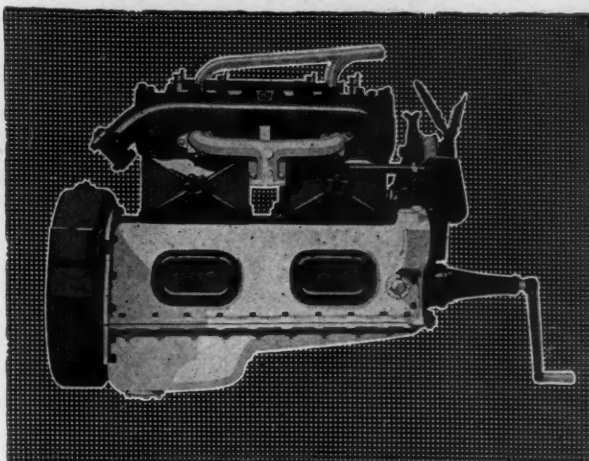
FOR TRUCK AND PASSENGER
CAR MANUFACTURERS WHOSE
STANDARDS DEMAND THAT
EVERY DETAIL OF THEIR EQUIP-
MENT AS TO WORKMANSHIP,
MATERIAL AND DESIGN SHALL
BE THE

BEST OBTAINABLE

Snead & Company

Jersey City New Jersey

WE SOLICIT INQUIRIES



Waukesha
TRADE MARK

HIGH TORQUE MOTORS

(Maximum Pull at Usable Speed)

An ever increasing number of automotive
equipment manufacturers are assuring the
future of their product by specifying
WAUKESHA HIGH TORQUE MOTORS
as their chief unit.

WAUKESHA MOTOR COMPANY

WAUKESHA, WISCONSIN

The World's Largest Builders of Tractor and Truck Motors Exclusively

Winther Trucks

A complete line
of quality trucks
nationally known
and appreciated



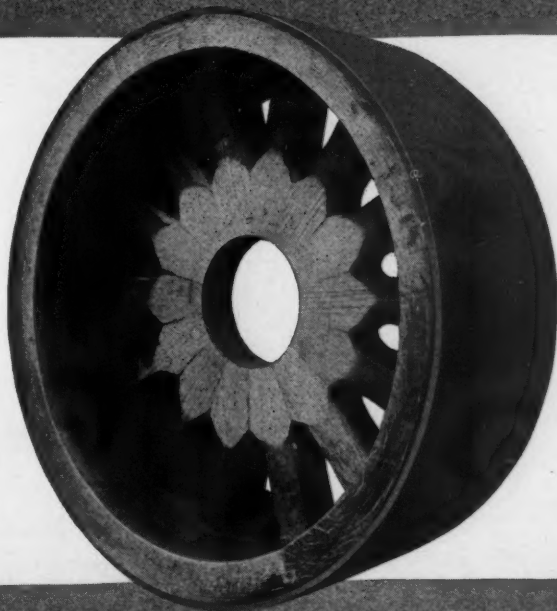
Winther Motor Truck Co.

Manufacturers of

Motor Trucks and Motor Cars

Kenosha, Wis.

MUNCIE WOOD WHEELS



STAND ALONE
MUNCIE WHEEL COMPANY

MUNCIE, IND.

FOUNDRY FOR SALE

PONTIAC, MICH.

within twenty-five miles of Detroit on good concrete road—good rail facilities. Fully equipped for aluminum, brass and bronze casting work, and could readily be converted to grey iron. Fifteen thousand square feet of floor space. One-story concrete block construction, built about two years ago. Four acres of land. Plant is centrally located and labor conditions are good. Will sell with or without equipment. For particulars and price write

Drawer 47, Syracuse, N. Y.

SUPER TWO-STAGE MOTOR-DRIVE COMPRESSOR UNIT



A NEW TYPE COMPRESSOR designed especially to handle Giant Pneumatic Tire Service and all other heavy duty requirements up to 350 pounds

*Bulletin Describing Complete Line of
Sizes and Equipments on Request*

GLOBE MANUFACTURING COMPANY
BATTLE CREEK MICHIGAN

Wilson
"That's Haul"

J. C. WILSON COMPANY
Detroit Michigan

Replacement Springs
offering

**Bigger
Profits**
for Dealers

for
all
makes
of Cars



Only the finest carbon or alloy steel used. These are scientifically heat-treated and tempered in oil. Results in utmost resiliency combined with endurance. Made with or without center bolts.

**15,000 Springs
Always in Stock**

Instant delivery, no matter what make of car. Every spring bears our long-time guarantee of satisfaction or money back quick. For faster service and bigger profits sell Maremont Springs.

Write today for our Catalogue and extraordinary offer

Maremont Mfg. Co.

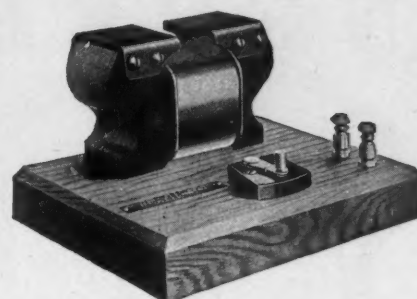
916-918 S. Wabash Ave., Chicago
534-538 West 58th St. New York

NIEHOFF MAGNETIZER

This is a new type of Magnetizer, based upon scientific and economical principles. You could not get a better outfit at any size or price. It is guaranteed to fully recharge all makes of magnets, such as are used on automobiles, trucks and tractors. It has a pulling capacity of 250 pounds by test. The Niehoff Laminated Magnetizer is constructed to last a lifetime. The parts that are subject to wear, after long usage, can easily be replaced at a small cost.

Get this outfit and know that you are equipped with the finest and most efficient Magnetizer made.

PAUL G. NIEHOFF & CO., INC.
244 E. Ohio St. Chicago, Ill.



Made in two types for 6-volt storage battery and for 110 D. C. Current



"Attracting and holding 250 pounds of girls"

TRUCK LAMP BRACKETS

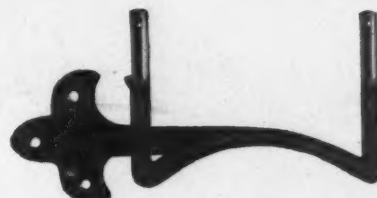
FOR
ELECTRIC OR GAS LAMPS

Can Ship Promptly

THE CLEVELAND HARDWARE CO.
CLEVELAND, OHIO



Drop Forged
No. 2675 A, Blank



Drop Forged
No. 2675 A, Machined

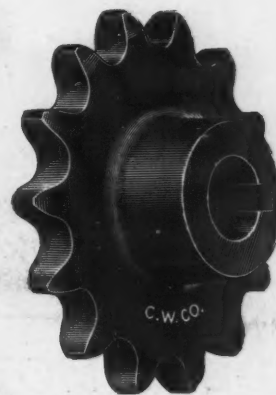
CULLMAN SPROCKETS

in stock and to order



For Block, Roller and High Speed Silent Chains
New Catalog

Cullman Wheel Co., 1351 Altgeld St., Chicago



SPECIFY FAHRIG METAL

*The Best Bearing Metal
on the Market*

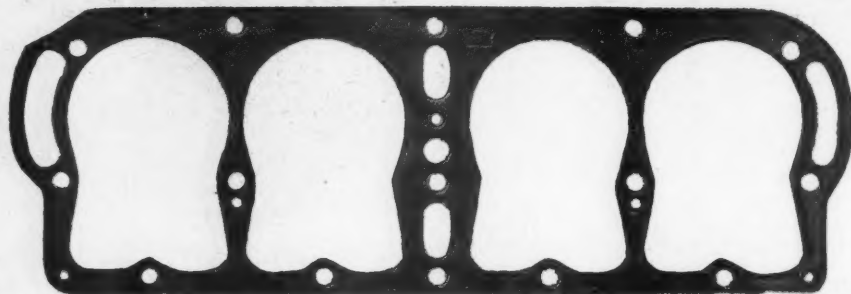
A special process tin base, copper-hardened alloy for crankpin and crankshaft bearings. Uniform and homogeneous. Used like a regular babbitt metal, but has superior anti-friction qualities and great durability.

The only one we make. The only ones that make it.

FAHRIG METAL COMPANY
34 COMMERCE STREET NEW YORK



ON ALL GASKET REPLACEMENT JOBS USE
NEVER-LEAK CYLINDER-HEAD GASKETS

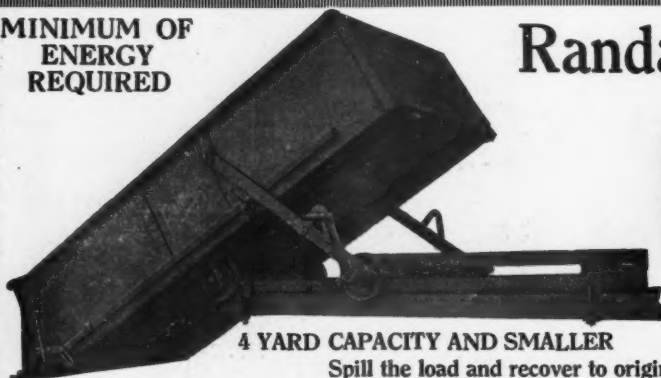


Not only are they the best and tightest but they cost less than other good gaskets. There's a Never-Leak gasket for every size and make of truck and passenger car. See that your stock is complete, for service stations report a continued demand for them.

The Fitzgerald Mfg. Co.
 Torrington Conn.



MINIMUM OF
 ENERGY
 REQUIRED



4 YARD CAPACITY AND SMALLER

Spill the load and recover to original position in less time than any other dumping device

SOME TERRITORIES STILL OPEN FOR AGGRESSIVE DEALERS

Randall Steel Dumping Bodies
 IMMEDIATE DELIVERIES



2 TO 4 REVOLUTIONS OF CRANK DUMP THE LOAD

Randall Steel Dumping Bodies Company Sales Dept., 814 Hearst Bldg. Chicago, Ill.



THE DUTY TRUCK

A powerful, rugged TWO-TON TRUCK, with overhead valve motor; heavy standard units; S. A. E. specifications.

Chassis, with bumper, tool box, lights, seat and tool equipment. Price \$1490 f. o. b. factory.

DUTY MOTOR CO.

Greenville, Ills.

ATLAS AXLES



2, 3½ and 5 Ton Sizes

THE hollow, light-weight load-carrying member is a one-piece cast-steel box girder. Due to the unique disposition of all the metal in relation to the neutral axis, its extreme stiffness, strength and resistance to deflection is vastly greater than that of a solid axle of equal weight. A copy of our bulletin gladly sent on request.

American Machine Co.
 Newark, Delaware

EASYDUMP

(A Boy Can Operate One)

**Dumps a 3 Yard Load From Either Side or Rear in 2 Minutes**

A demonstration of the EASYDUMP, three-way dump body with Bruder Hand Hoist is convincing.

Will dump in any weather; cannot get out of order. Outlasts the life of any chassis. Made in various capacities, from 1 to 5 tons for all makes of trucks. Furnished with all-steel body, or wood (oak) body and solid steel bottom.

Also furnished for rear dumping only. Special body and hoist for Ford one ton chassis.

Its many valuable time and labor saving advantages influence customers to buy trucks equipped with EASYDUMP bodies. Write for interesting dealer proposition.

Manufactured Exclusively by

LAWRENCE BRUDER

Department 10

211-213 W. Second Street

Cincinnati, Ohio



The truck, tractor or motor car containing a Covert Transmission may cost slightly more, but it will be far more valuable to you.

COVERT GEAR CO., INC.

Sales, Engineering and Factory: Lockport, N. Y.

Export Offices: 100 Broad Street, New York City

Vulcan Axles

Drawings and specifications for this new type axle are ready for motor truck builders

Vulcan Motor Axle Corporation

DETROIT

MICHIGAN

Sanford Trucks

**2½, 3½ and 5
Ton Capacity**

Sanford Motor Truck Co.

SYRACUSE

NEW YORK



MANSFIELD TRAILER OR TOWING ATTACHMENTS, Types "E" and "G," can be applied to any truck in one hour or less. It is only necessary to drill seven 11-16" holes, and all the tools required are a breast drill and wrench.

MANSFIELD STANDARD RADIATOR GUARDS, Types "A," "B" and "C," have been "LISTED AS STANDARD" by the Underwriters' Laboratories. We are handling with the National Automobile Underwriters' Conference in an effort to secure reduction in collision insurance for all trucks equipped with our guard.

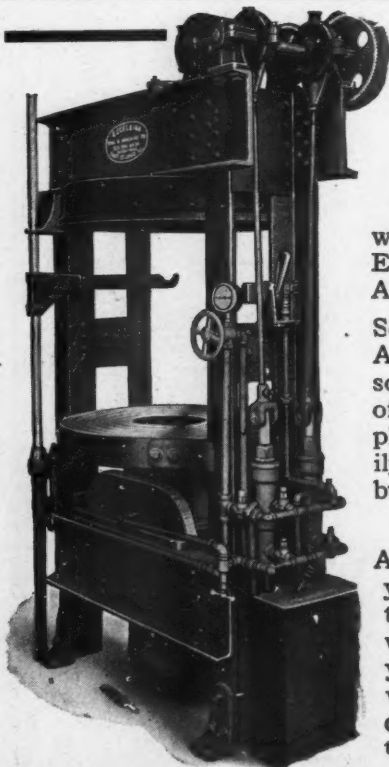
MANSFIELD COMBINATION FRONT BUMPER AND TOW HOOKS, Type "I," for trucks with curved or gooseneck frames.

MANSFIELD HAND FORGED TOW HOOKS, Type "D," can be used on front and rear of trucks.

We also manufacture Steel Dump Bodies, Steel Stake Bodies, Hand Hoists and complete DUMPING UNITS for all small trucks.

Write for Catalog

MANSFIELD STEEL CORPORATION
Detroit, Michigan



Watch Business Roll in

when you operate an
**EXCELSIOR TIRE
APPLYING PRESS.**

Solid tires *will* wear down. And when the owners of solid-tired trucks know you offer quick, expert tire applying service—you speedily get their replacement business.

Truck Dealers

An EXCELSIOR provides you with a splendid opportunity to increase goodwill—and profits. Furnish your customers with this vital service.

Get the facts regarding this time-tested business builder. *Write.*

EXCELSIOR TOOL & MACHINE CO., East St. Louis, Ill.

EXCELSIOR 225 TON TIRE APPLYING PRESS No. 34

ATLAS WORM-DRIVE "MERCHANTS' DISPATCH"

Now \$1655

CHASSIS F.O.B. YORK, PENNA.

LOWER prices are the order of the day, but if they are effected at the sacrifice of the quality of workmanship and material they are dearly bought.

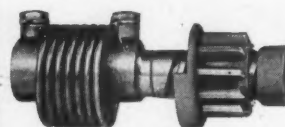
Our present reduction in price is secured by the elimination of our profit, in the faith that the future will bring us a just reward for our efforts.

The opportunity is yours—seize it.

*Individualized Body Equipment
for Every Business*

ATLAS TRUCK CORPORATION
York, Pennsylvania

BENDIX
ECLIPSE
DRIVE
for ELECTRIC
STARTERS



AUTOMATIC ENGAGING
& DISENGAGING

194 Motor Car and
Truck Builders
Use It

ECLIPSE MACHINE CO.
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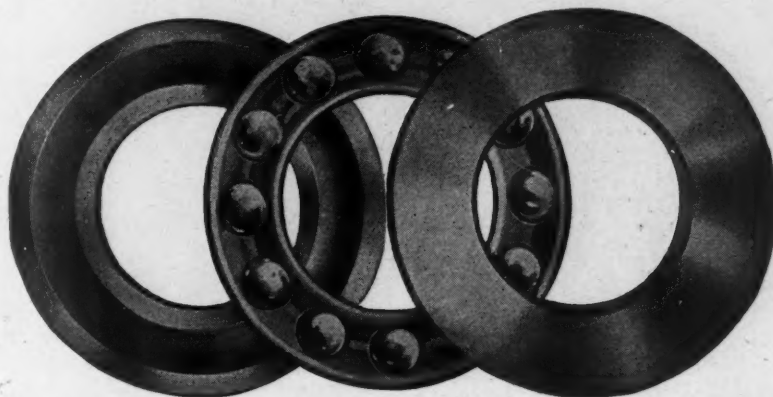
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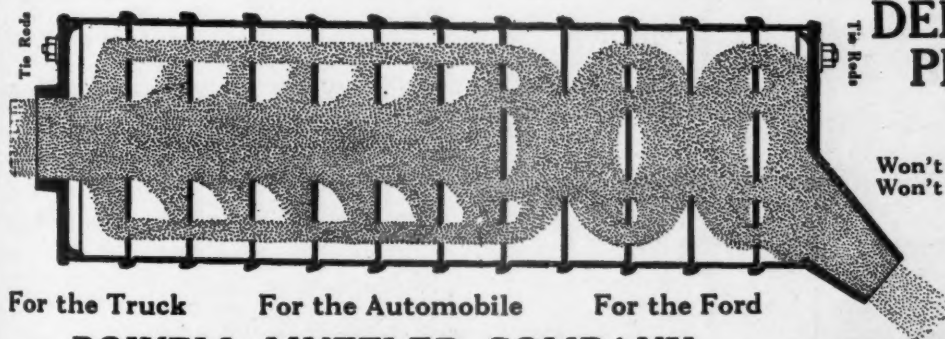
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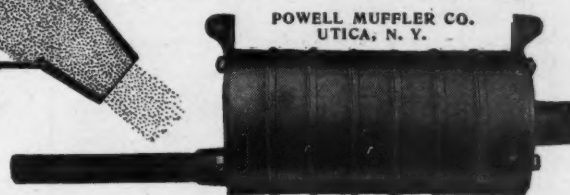
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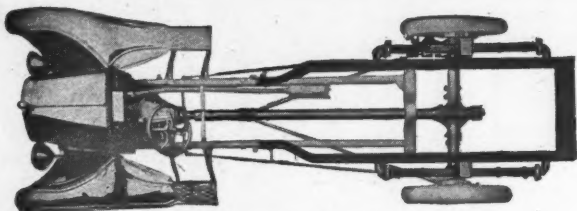
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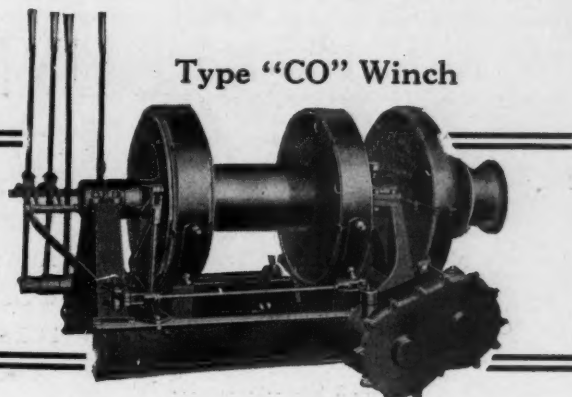
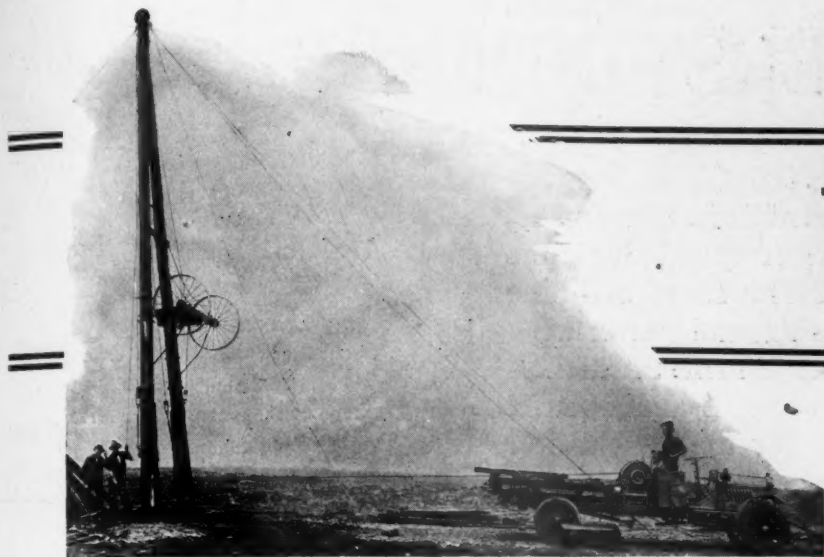
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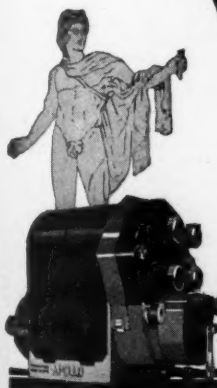
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BUYERS' INDEX

Air Compressors.

Globe Manufacturing Co.	256
Rex Machine Co.	243
Sundstrom Manufacturing Co.	243

Anti-Skid & Traction Devices.

Arrow Grip Mfg. Co., Inc.	232
Daubenspeck Chain Co.	234
Foley Traction Rim Co.	247
Giant Grip Mfg. Co.	166
Rowe Calk & Chain Co.	221

Anti-Squeak Material

Hide Leather & Belting Co.	210
---------------------------------	-----

Asbestos Yarn & Cloth

General Asbestos & Rubber Co.	223
------------------------------------	-----

Axles

Adams Axle Co.	238
American Machine Co.	258
Clark Equipment Co.	Inside Front Cover
Columbia Axle Co.	217
Flint Motor Axle Co.	218
Russel Motor Axle Co.	Inside Back Cover
Schultz, R. A. Mfg. Co.	271
Sheldon Axle & Spring Co.	191
Timken-Detroit Axle Co.	195
Torbensen Axle Co.	209
Vulcan Motor Axle Co.	259
Walker Axle Co.	252

Axle Housings

Bossett Corporation, The (Pressed Steel).	261
Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124

Axle Housing Covers

Parish & Bingham Corporation	124
-----------------------------------	-----

Ball Bearings

Bantam Ball Bearing Co.	250
Bearings Co. of America	261
Fafnir Bearing Co.	247
Federal Bearings Co., Inc.	140
Gurney Ball Bearing Co.	219
Norma Co. of America	5
S K F Industries, Incorporated	107
U. S. Ball Bearing Mfg. Co.	147

Balls, Brass & Steel

S K F Industries, Incorporated	107
-------------------------------------	-----

Ball Retainers

Bearings Co. of America	261
------------------------------	-----

Batteries, Storage & Parts

Electric Storage Battery Co.	212
-----------------------------------	-----

Battery Charging Outfits

Double E. E. Co.	64
Superior Engineering Co.	64

Battery Ignition Systems

Westinghouse Electric & Manufacturing Co.	219
--	-----

Bearings & Bushings

Bantam Ball Bearing Co.	250
Bearings Co. of America	261
Bound Brook Oil-less Bearing Co.	120
Federal Bearings Co., Inc.	140
Gurney Ball Bearing Co. (Thrust)	219
Norma Co. of America (Thrust)	5
U. S. Ball Bearing Mfg. Co.	147

Bearing Grinding Compound

M. T. K. Products Co.	63
----------------------------	----

Bearing Metal

Fahrig Metal Co.	257
-----------------------	-----

Bearing Service

Bearings Service Co.	262
---------------------------	-----

Bodies

Arcadia Trailer Corporation	137
Archer Iron Works	249
Auglaize Motor Car Co.	262
Automatic Dump Car Co.	238
Babcock, H. H., Co.	123
Bergstrom-Brewster Motor Co.	46
Bruder, Lawrence	259
Clark, J. L., Mfg. Co.	254
Collins Plow Co.	47
Columbian Steel Tank Co.	136
Hell Co.	121
Highland Body Mfg. Co.	207
Luverne Motor Truck Co.	241
Mansfield Steel Corporation	260
Martin-Parry Corporation	183

This is NOT an index of what manufacturers make, but merely an index of the CONTENTS of both the reading and advertising pages of THIS PARTICULAR ISSUE, and is placed here for the benefit and convenience of our readers

Metropolitan Body Co.	248
National Steel Products Co.	236
Randall Steel Dumping Bodies Co.	258
Simplex Manufacturing Co.	235
Standard Steel Works	244
Stewart Iron Works, Inc.	242
Transportation Equipment Co., Inc.	251
Wood Hydraulic Hoist & Body Co.	241

Boring Machines

Baker Bros.	65
Storm Mfg. Co.	31
Universal Tool Co., Inc.	91

Brake Drums

Bossett Corporation, The	261
Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124

Brake Lining

General Asbestos & Rubber Co.	223
Johns-Manville, Inc.	138, 139
Multibestos Co.	176
Staybestos Mfg. Co.	237
Thermoid Rubber Co.	153, 201

Bumpers

Mansfield Steel Corporation	260
----------------------------------	-----

Bushing Removers

Conant & Donelson	32
------------------------	----

Bus Bodies

Armleder, O., Co.	36
Autocar Co.	40
Bergstrom-Brewster Co.	38
Columbia Motor Truck Co.	40
Cook, Charles L., Buss Co.	34
Dearborn Truck Co.	37
Fitz Gibbon & Crisp Co.	39
Garford Motor Truck Co.	38
Higrade Motors Co.	39
Hopkins Mfg. Co.	39
Kratzer Carriage Co.	36
Luff Corp.	39
Marx, Geo. B.	37
Miller, E. M., Co.	39
Rainier Motor Corp.	39
Reo Motor Car Co.	36
Springfield Commercial Body Co.	36
Stoughton Wagon Co.	35
U. S. Motor Truck Co.	40
Vreeland Motor Co.	38
Wentworth & Irwin	37

Cabs

Acme Motor Truck Co.	45
Babcock, H. H., Co.	62, 128
Clark, J. L., Mfg. Co.	254
Collins Plow Co.	47
Detroit Weatherproof Body Co.	250
Highland Body Mfg. Co.	207
Luverne Motor Truck Co.	241
Sheet Steel Products Co.	62, 246

Camshafts

Muskegon Motor Specialties Co.	246
-------------------------------------	-----

Carburetors & Outfits

Stromberg Motor Devices Co.	181
Zenith Carburetor Co.	229

Car Pullers

Mead-Morrison Manufacturing Co.	155
--------------------------------------	-----

Castings

(See Aluminum, Bronze & Brass, Iron Castings, Die Castings, Malleable & Steel Castings)

Cement

Johns-Manville Co.	138, 139
-------------------------	----------

Chains

Arrow Grip Mfg. Co., Inc.	232
Cullman Wheel Co.	257
Daubenspeck Chain Co.	234
Giant Grip Mfg. Co.	166
Rowe Calk & Chain Co.	222

Chain Blocks

Ford Chain Block Co.	253
---------------------------	-----

Chucks

S K F Industries, Incorporated	107
-------------------------------------	-----

Clamps

Rowe Calk & Chain Co. (Spoke)	222
Williams, J. H. & Co.	226

Cleaning Compounds

Oakley Chemical Co.	227
--------------------------	-----

Clutches

Detlaff, A. J., Co.	231
Fuller & Sons Mfg. Co.	196
Merchant & Evans Co.	220

Clutch Facings

Johns-Manville Co.	138, 139
-------------------------	----------

Clutch Parts

Curtis Clutch Disc Co.	245
-----------------------------	-----

Cocks

Jorgensen Mfg. Co. (Pet)	237
Michigan Lubricator Co. (Air, Drain & Gasoline)	242

Commercial Cars

Ward Motor Vehicle Co.	142
-----------------------------	-----

Commercial Cars

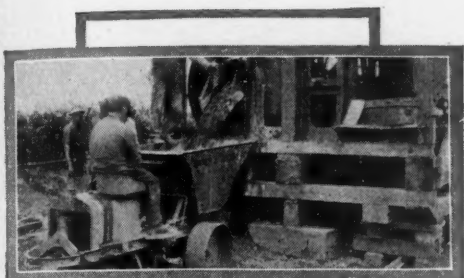
(Gasoline)

Allstrom Motors, Inc.	42
Ace Motor Trucks	187
Acme Motor Truck Co.	230
American Commercial Car Co.	231
American-La France Fire Engine Co., Inc.	149
American Motor Truck Co.	187
Armleder, O., Co.	184, 185
Atlas Truck Corporation	260
Atterbury Motor Car Co.	99
Autocar Co.	12
Available Truck Co.	135
Bessemer Motor Truck Co.	123
Bethlehem Motors Corp.	43
Bridgeport Motor Truck Co.	254
Carrier Motor Truck Co.	236
Clydesdale Motor Truck Co.	165
Dart Truck & Tractor Corp.	246
Day-Elder Motors Corporation	125
Defiance Motor Truck Co.	4
Dependable Truck & Tractor Co.	252
Denby Motor Truck Co.	237
Duplex Truck Co.	216
Duty Motor Co.	258
Federal Motor Car Co.	243
Garford	109
Gary Motor Truck Co.	194
Graham Brothers	154
Grant Motor Car Corporation	250
Harrisburg Mfg. & Boiler Co.	41
Independent Motor Truck Co., Inc.	228
International Harvester Co. of America, Incorporated	163
International Motor Co.	159
Kalamazoo Motors Corporation	242
Keystone Motor Truck Corporation	198
Kissel Motor Car Co.	247
Larrabee-Deyo Motor Truck Co.	228
Luverne Motor Truck Co.	47-62
Master Trucks, Inc.	175
Minneapolis Steel & Machinery Co.	131
Moline Plow Co.	263
Napoleon Motors Co.	253
Nash Motors Co.	145
Nelson Motor Truck Co.	111
Noble Motor Truck Corporation	221
Oshkosh Motor Truck Co.	239
Parker Motor Truck Co.	234
Pierce-Arrow Motor Car Co.	211
Rainier Motor Corporation	46, 269
Republic Truck Sales Corporation, Front Cover	190
Rowe Motor Mfg. Co.	259
Sanford Motor Truck Co.	239
Schacht, G. A., Motor Truck Co.	8
Selden Truck Corporation	192
Signal Motor Truck Co.	192



LE ROI the Little Giant of a Motor

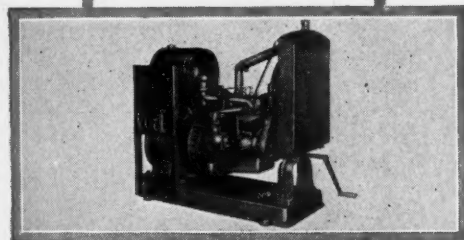
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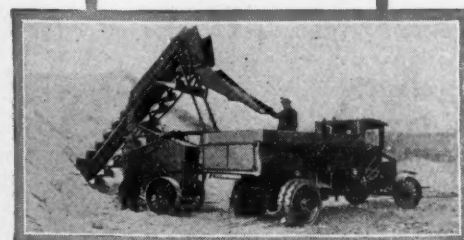
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The Toro Tractor



The Allis-Chalmers Lighting Set



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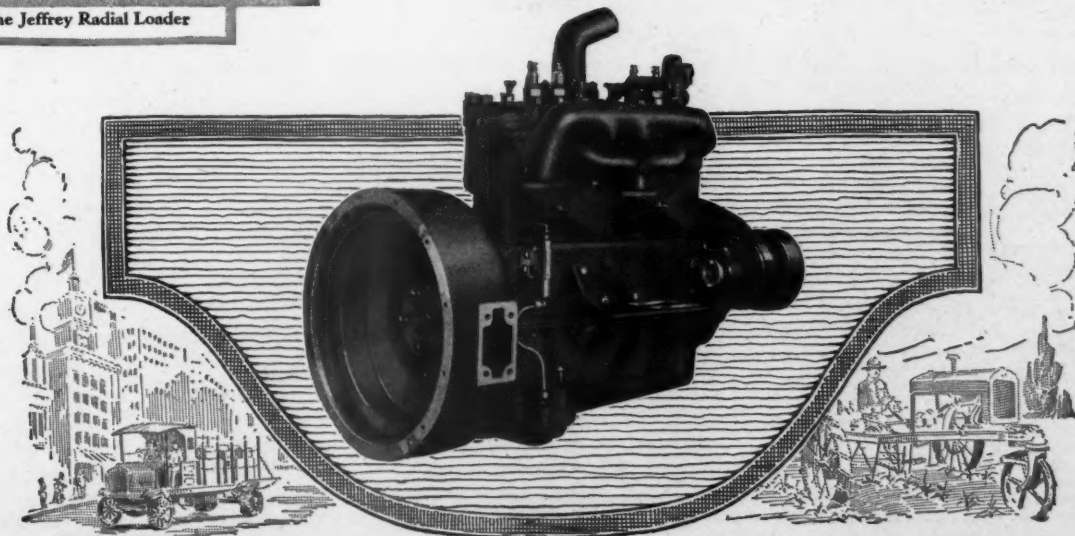
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LE ROI COMPANY



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BUYERS' INDEX—Continued

Standard Motor Truck Co.	113
Stewart Motor Corporation.....	Back Cover
Stoughton Wagon Co.	271
Sullivan Motor Truck Corporation	245
Thomart Motor Co.	115, 116, 117, 118
Tiffin Wagon Co.	220
Titan Truck Co.	249
Tower Motor Truck Co.	244
Traffic Motor Truck Corporation.....	151, 152
Transport Truck Co.	178
Union Motor Truck Co.	248
United States Motor Truck Co.	238
Velle Motors Corporation	251
Walter Motor Truck Co.	169, 170
Ward La France Truck Corp.	240
Wilson, J. C., Co.	256
Winther Motor Truck Co.	255

Controls & Control Sets

Baker Gun & Forging Co.	261
------------------------------	-----

Conveyors

Mead-Morrison Manufacturing Co.	155
--------------------------------------	-----

Crankshafts

Park Drop Forge Co.	239
Union Switch & Signal Co.	228
Wyman-Gordon Co.	253

Curb Outfits (Gasoline)

Bowser, S. F. & Co., Inc.	122
Tokheim Oil Tank & Pump Co.	214

Cushion Wheels

Sewell Cushion Wheel Co.	103
-------------------------------	-----

Cylinder Reboring & Regrinding

Modern Electric & Machine Co.	253
------------------------------------	-----

Differentials

Brown-Lipe-Chapin Co.	215
Cleveland Worm Gear Co.	223
New Process Gear Corporation	114

Drilling Machines (Bench and Post)

Barnes Drill Co.	65
Canedy-Otto Mfg. Co.	33

Drills

Cincinnati Electric Co.	90
Hisey-Wolf Machine Co.	90
Hunter, James, Machine Co.	66
Morris Machine Tool Co.	66
Peterson, A. H., Mfg. Co.	90
Stenman Electric Tool Co. (Hand)	64
Wisconsin Electric Co.	66

Drill Stands

Hisey-Wolf Machine Co.	90
-----------------------------	----

Dumping Units

Horizontal Hydraulic Hoist Co.	240
-------------------------------------	-----

Dust Shields

Hydraulic Pressed Steel Co.	143
----------------------------------	-----

Electric Lighting Systems

(See Starting & Lighting Outfits)

Electric Testing Instruments

Niehoff, Paul G. & Co., Inc.	257
-----------------------------------	-----

Engines

Buda Co.	105
Continental Motors Corporation	174
Herschell-Spillman Motor Co.	58
Le Roi Co.	265
Lycoming Motors Corporation	186
Midwest Engine Co.	177
Turner & Moore Mfg. Co.	249
Waukesha Motor Co.	255
Weidely Motors Co.	272
Wisconsin Motor Mfg. Co.	241

Engine Pans

Parish & Bingham Corporation	124
------------------------------------	-----

Engine Stands

Canedy-Otto Mfg. Co.	33
---------------------------	----

Equipment & Parts for Ford Cars

American Taximeter Co.	254
Canedy-Otto Mfg. Co.	33
Collins Plow Co.	47
Conant & Donelson	32
Double, E. E., Co.	64
General Asbestos & Rubber Co.	223
Martin-Parry Corporation	188
Modine Mfg. Co.	33
Powell Muffler Co.	261
Swedish Crucible Steel Co.	263
Tribune Engineering Co., Inc.	90
Veeder Mfg. Co.	229

Fan Belts

Hide Leather & Belting Co.	210
---------------------------------	-----

Fenders

A. B. & B. Sheet Metal Works.....	242
Motors Metal Mfg. Co.	224

Ferro Alloys

Climax Molybdenum Co.	7
----------------------------	---

Filters (Oil)

Bowser, S. F. & Co., Incorporated.....	122
--	-----

Fire Apparatus

American-La France Fire Engine Co., Inc.	149
Childs, O. J., Co.	180

Fire Extinguishers

Johns-Manville, Inc.	138, 139
---------------------------	----------

Fittings, Brass, Tank, Etc.

Bowen Products Corp.	224
Michigan Lubricator Co.	242

Flooring (Ventilating)

Irving Iron Works	225
------------------------	-----

Forgings

Bearings Co. of America	261
Billings & Spencer Co.	161
Brewer-Titchener Corporation	262
Champion Machine & Forge Co.	251
Park Drop Forge Co.	239
Union Switch & Signal Co.	228
Western Drop Forge Co.	199
Williams, J. H. & Co.	226
Wyman-Gordon Co.	253

Frames

Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124
Sharon Pressed Steel Co.	202
Smith, A. O., Corporation	222

Gaskets

Fitzgerald Mfg. Co.	258
General Asbestos & Rubber Co.	223

Gasoline & Oil Storage Outfits

Bowser, S. F. & Co., Inc.	122
Hell Co.	121
Janney, Steinmetz & Co.	251
Tokheim Oil Tank & Pump Co.	214

Gears and Gear Cutting

Brown-Lipe-Chapin Co.	215
Brown-Lipe Gear Co.	215
Cleveland Worm Gear Co.	223
Covert Gear Co., Inc.	259
Detroit Gear & Machine Co.	254
Durston Gear Corporation	244
Fuller & Sons Mfg. Co.	196
New Process Gear Corporation	114
Warner Gear Co.	168
Weeks-Hoffman Co.	236

Gear Pullers

Continental Auto Parts Co.	32
---------------------------------	----

Generators

Imperial Brass Mfg. Co. (Acetylene)	31
--	----

Governors (Engine)

Duplex Engine Governor Co., Inc.	238
Monarch Governor Co.	179
Pierce Governor Co.	244

Grease & Oil Cups

Bennett Injector Co.	206
---------------------------	-----

Grease & Oil Cups & Guns

Bennett Injector Co.	206
Bowen Products Corporation	224
Michigan Lubricator Co.	242
Monson, Charles S.	240

Grease Handling Devices

Bennett Injector Co.	206
---------------------------	-----

Grinding Machines (Cylinder)

Sanford, F. C., Mfg. Co.	65
-------------------------------	----

Grinding & Polishing Outfits

Webb Mfg. Co.	64
--------------------	----

Heaters

Perfection Heater & Mfg. Co.	171
-----------------------------------	-----

Hoists & Cranes

Archer Iron Works	249
Auglaize Motor Car Co.	262
Bay City Foundry & Machine Co.	263
Bruder, Lawrence	259
Columbian Steel Tank Co.	136
Ford Chain Block Co.	253
Hell Co.	121
Horizontal Hydraulic Hoist Co.	240
Hydraulic Hoist Mfg. Co.	234
Mansfield Steel Corporation	260
Mead-Morrison Manufacturing (Steam & Electric) Co.	155
National Steel Products Co.	236
Simplex Manufacturing Co.	235
Standard Steel Works	244
Wood Hydraulic Hoist & Body Co.	241

Hoods

A. B. & B. Sheet Metal Works	242
Motors Metal Mfg. Co.	224

Hub Flanges

Bossett Corporation, The	261
Hydraulic Pressed Steel Co.	143

Hub Odometers

American Taximeter Co.	254
Veeder Mfg. Co.	229

Ignition Specialties

American Bosch Magneto Corporation.....	146
Apollo Magneto Corporation	263
Eisemann Magneto Corporation	183
Splitdorf Electrical Co.	127
Teagle Co.	225
Westinghouse Electric & Manufacturing Co.	219

Inner Tubes

Dunlop Tire & Rubber Corporation of America	156, 157
---	----------

Jacks

Arrow Grip Mfg. Co.	33
Norlund Novelty Co.	32
Rowe Calk & Chain Co.	222
Simplicity Products Mfg. Co.	33
Walker Mfg. Co.	213

Lamps

Dietz, R. E., Co.	240
Indiana Lamp Co.	31

Lamp Brackets

Cleveland Hardware Co.	257
-----------------------------	-----

Links (Lock)

Rowe Calk & Chain Co.	222
----------------------------	-----

Lock Nuts & Washers

Selflock Nut & Bolt Co., Inc.	132
------------------------------------	-----

Lubricants

Sinclair Refining Co.	241
----------------------------	-----

Lubricators

Michigan Lubricator Co.	242
------------------------------	-----

Machines

(See Tools, Machines, Etc.)

Magnetizers

Niehoff, Paul G. & Co., Inc.	257
-----------------------------------	-----

Magnetos

American Bosch Magneto Corporation.....	146
Apollo Magneto Corporation	263
Eisemann Magneto Corporation	183
Splitdorf Electrical Co.	127
Teagle Co.	225

Malleable Castings

American Malleable Castings Association.....	167
--	-----

Motors (Gasoline)

(See Engines, Gasoline)

Mufflers & Cutouts

Powell Muffler Co.	261
-------------------------	-----

Oils

(See Lubricants)

Oil Burners

Hauck Manufacturing Co.	91
------------------------------	----

Oil Indicators

Michigan Lubricator Co.	242
------------------------------	-----

Packings

General Asbestos & Rubber Co.	223
Johns-Manville, Inc.	138, 139

Piston Aligning Devices

Continental Auto Parts Co.	32
---------------------------------	----

BUYERS' INDEX—Continued

Pistons, Rings & Pins

American Hammered Piston Ring Co.	9
Clark-Turner Piston Co.	148
Eco Mfg. Co.	237
Gill Manufacturing Co.	172, 173
Modern Electric & Machine Co.	253
Piston Ring Co.	133
Pressure Proof Piston Ring Co.	248
Splitdorf Electrical Co.	127

Pressed Steel Frames

Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124
Smith, A. O., Corporation	222

Pressed Steel Parts

Parish & Bingham Corporation	124
--	-----

Pressed Steel Tanks

Heil Co.	121
Janney, Steinmetz & Co.	251

Presses (Hand & Tire)

Excelsior Tool & Machine Co.	260
--------------------------------------	-----

Primers

Jorgensen Mfg. Co.	237
----------------------------	-----

Propeller Shafts

Snead & Co.	255
Spicer Manufacturing Corporation	164

Pumps (Garage Tire)

(See Air Compressors & Pumps)

Pumps (Gasoline & Oil)

Bowser, S. F. & Co., Inc.	122
Tokheim Oil Tank & Pump Co.	214

Pumps & Guns (Grease, Oil)

Bennett Injector Co. (Barrel Grease)	206
--	-----

Pumps (Power Tire)

Kellogg Manufacturing Co.	6
Rex Machine Co.	243
Sunstrom Manufacturing Co.	243

Punch Presses

Excelsior Tool & Machine Co.	260
--------------------------------------	-----

Radiators

G. & O. Manufacturing Co.	11
Long Manufacturing Co.	189
Modine Manufacturing Co.	33

Radiator Guards

Irving Iron Works Co.	225
Mansfield Steel Corporation	260
Stewart Iron Works, Inc.	242

Reamers

Conant & Donelson	32
Halburn Co.	91
Tribune Engineering Co., Inc.	90

Rims

Foley Traction Rim Co.	247
Luverne Motor Truck Co.	236

Roller Bearings

Bower Rolling Bearing Co.	160
Gilliam Mfg. Co.	197
Hyatt Roller Bearing Co.	144
Norma Co. of America	5
Timken Roller Bearing Co.	205

Roofing (Asbestos)

Johns-Manville, Inc.	138, 139
------------------------------	----------

Running-Boards & Shields

Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124

Screw Plates

Conant & Donelson	32
-----------------------------	----

Sediment Traps

Michigan Lubricator Co.	242
---------------------------------	-----

Service (Piston)

Modern Electric & Machine Co.	253
---------------------------------------	-----

Sheet Metal Parts

A. B. & B. Sheet Metal Works	242
Motors Metal Mfg. Co.	224

Sheet Metal Stampings

Bossett Corporation, The	261
------------------------------------	-----

Shims

Laminated Shim Co.	252
----------------------------	-----

Sod Pans

Motors Metal Mfg. Co.	224
-------------------------------	-----

Spark Plugs

Splitdorf Electrical Co.	127
----------------------------------	-----

Springs (Body)

Detroit Steel Products Co.	193
Iron City Spring Co.	243
Maremont Mfg. Co.	256
Mather Spring Co.	126
Perfection Spring Co.	134
Spring Perch Co.	129

Sprockets

Cullman Wheel Co.	257
---------------------------	-----

Stampings

Bossett Corporation, The	261
Brewer-Titchener Corporation	262
Hydraulic Pressed Steel Co.	143
Motors Metal Mfg. Co.	224
Motor Wheel Corporation	141

Starting & Lighting Outfits

American Bosch Magneto Corporation	146
Eclipse Machine Co. (Bendix Drive)	260
Splitdorf Electrical Co.	127

Steel

Climax Molybdenum Co.	7
Hogan, John R.	235

Steel Castings

Ohio Steel Foundry Co.	233
--------------------------------	-----

Steel Products

Motor Wheel Corporation	141
-----------------------------------	-----

Steering Apparatus

Lavine Gear Co.	10
Ross Gear & Tool Co.	97
Wohlrab Gear Co.	221

Step Hangers

Brewer-Titchener Corporation	262
Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124

Storage Battery Steamers

Hauck Mfg. Co.	218
------------------------	-----

Tanks (Air, Gasoline & Oil)

A. B. & B. Sheet Metal Works	242
Bowser, S. F. & Co., Inc.	122
Columbian Steel Tank Co.	136
Heil Co.	121
Janney, Steinmetz & Co.	251
Motors Metal Mfg. Co.	224
Tokheim Oil Tank & Pump Co.	214

Terminals

Eisemann Magneto Corp.	89
--------------------------------	----

Time Recorders

Calculagraph Co.	247
--------------------------	-----

Tires

Dunlop Tire & Rubber Corporation of America	156, 157
Fisk Rubber Co.	245
General Tire & Rubber Co.	239
Polack Tyre & Rubber Co.	119
Thermoid Rubber Co.	153, 201
United States Rubber Co.	101

Tire Inflators

(See Pumps, Power Tire)

Tools, Machines, Etc.

Continental Auto Parts Co.	38
Eisemann Magneto Corp.	89
Excelsior Tool & Machine Co.	260
Imperial Brass Mfg. Co.	91
Newman Mfg. Co.	63
Mossberg, Frank Co.	32, 230
Storm Mfg. Co.	31
Williams, J. H. & Co.	226

Tool Trays

Continental Auto Parts Co.	32
------------------------------------	----

Tops

Detroit Weatherproof Body Co.	250
---------------------------------------	-----

Top Materials

Du Pont Fabrikoid Co.	150
Pantasote Co.	203

Torches

Hauck Mfg. Co.	218
------------------------	-----

Torque Arms

Hydraulic Pressed Steel Co.	143
Parish & Bingham Corporation	124

Towing Poles

Simplicity Products Mfg. Co.	33
--------------------------------------	----

Tractors

Dart Truck & Tractor Corp.	246
------------------------------------	-----

Trailers

Arcadia Trailer Corporation	137
Byron Engineering Works, Inc.	44, 233
Detroit Trailer Co.	250
Fruehauf Trailer Co.	271
Highway Trailer Co.	200
King Trailer Co.	248
Miami Trailer Co.	45
Ohio Motor Vehicle Co.	243
Trailmobile Co.	158
Warner Mfg. Co.	232

Transmissions

Brown-Lipe Gear Co.	215
Covert Gear Co.	259
Detroit Gear & Machine Co.	254
Durston Gear Corporation	244
Fuller & Sons Mfg. Co.	196

Transmission Hangers

S K F Industries, Incorporated	107
--	-----

Transmission Linings

General Asbestos & Rubber Co.	223
Staybestos Mfg. Co.	237

Truck Attachments & Converting Units

Carrier Motor Truck Co.	236
Luverne Motor Truck Co. (Converting Passenger Cars into Trucks)	241
Swedish Crucible Steel Co.	262

Tubing (Steel)

Titeflex Metal Hose Corporation	252
---	-----

Turret Machines

Newman Mfg. Co.	63
-------------------------	----

Universal Joints

Arvac Manufacturing Co.	227
Baker Gun & Forging Co.	261
Blood-Bros. Machine Co.	249
Merchant & Evans Co.	220
Snead & Co.	255
Spicer Manufacturing Corporation	164
Thermoid Rubber Co.	153, 201
Universal Machine Co.	246

Upholstery Material

DuPont Fabrikoid Co.	150
------------------------------	-----

Valve Lifters

Feilbach, F. O.	66
-------------------------	----

Wheels

Automotive Wood Wheel Manufacturers' Association	182
Clark Equipment Co.	Inside Front Cover
Luverne Motor Truck Co.	236, 241
Motor Wheel Corporation	141
Muncie Wheel Co.	255
Schwartz Wheel Co.	162
Sewell Cushion Wheel Co.	103

Wheel Pullers

Mossberg, Frank Co.	32
-----------------------------	----

Whistles

Buell Manufacturing Co.	245
---------------------------------	-----

Winches

Bay City Foundry & Machine Co.	263
Mead-Morrison Manufacturing Co.	155

Wrenches

Mossberg, Frank, Co.	32, 230
------------------------------	---------

Advertisers' Index

A

A. B. & B. Sheet Metal Works.....	242
Acme Motor Truck Co.....	230
Adams Axle Co.....	238
American Bosch Magneto Corporation.....	146
American Commercial Car Co.....	231
American Hammered Piston Ring Co.....	9
American LaFrance Fire Engine Co., Inc.....	149
American Machine Co.....	258
American Malleable Castings Association.....	167
American Motor Truck Co.....	187
American Taximeter Co.....	254
Apollo Magneto Corporation.....	263
Arcadia Trailer Corporation.....	137
Archer Iron Works.....	249
Armleder, O., Co.....	184, 185
Arrow Grip Mfg. Co., Inc.....	232
Arvac Manufacturing Co.....	227
Atlas Truck Corporation.....	260
Atterbury Motor Car Co.....	99
Auglaize Motor Car Co.....	262
Autocar Co.....	12
Automatic Dump Car Co.....	238
Automotive Wood Wheel Manufacturers' Association.....	182
Available Truck Co.....	135

B

Babcock, H. H., Co.....	128
Baker Gun & Forging Co.....	261
Bantam Ball Bearing Co.....	250
Bay City Foundry & Machine Co.....	271
Bearings Co. of America.....	261
Bearings Service Co.....	262
Bennett Injector Co.....	206
Bessemer Motor Truck Co.....	123
Billings & Spencer Co.....	161
Blood-Bros. Machine Co.....	249
Bossert Corporation, The.....	261
Bound Brook Oil-less Bearing Co....	120
Bowen Products Corporation.....	224
Bower Roller Bearing Co.....	160
Bowser, S. F., & Co., Inc.....	122
Brewer-Titchener Corporation.....	262
Bridgeport Motor Truck Co.....	254
Brown-Lipe-Chapin Co.....	215
Brown-Lipe Gear Co.....	215
Bruder, Lawrence.....	259
Buda Co.....	105
Buell Manufacturing Co.....	245
Byron Engineering Works, Inc.....	233

C

Calculagraph Co.....	247
Carrier Motor Truck Co.....	236
Champion Machine & Forge Co.....	251
Childs, O. J., Co.....	180
Chilton Co.....	130, 203, 204
Clark Equipment Co. Inside Front Cover	
Clark, J. L., Mfg. Co.....	254
Clark-Turner Piston Co.....	148
Cleveland Hardware Co.....	257
Cleveland Worm Gear Co.....	223
Climax Molybdenum Co.....	7
Clydesdale Motor Truck Co.....	165
Columbia Axle Co.....	217
Columbian Steel Tank Co.....	136
Continental Motors Corporation....	174
Covert Gear Co., Inc.....	259
Cullman Wheel Co.....	257
Curtis Clutch Disc Co.....	245

D

Dart Truck & Tractor Corporation..	246
Daubenspeck Chain Co.....	234
Day-Elder Motors Corporation.....	125
Defiance Motor Truck Co.....	4
Denby Motor Truck Co.....	237
Dependable Truck & Tractor Co....	252
Detlaff, A. J., Co.....	231
Detroit Gear & Machine Co.....	254
Detroit Steel Products Co.....	193
Detroit Trailer Co.....	250
Detroit Weatherproof Body Co.....	250
Dietz, R. E., Co.....	240
Drawer 47.....	256
Dunlop Tire & Rubber Corporation of America.....	156, 157
Duplex Engine Governor Co., Inc..	238
Duplex Truck Co.....	216
Dupont Fabrikoid Co.....	150
Durston Gear Corporation.....	244
Duty Motor Co.....	258

E

Eclipse Machine Co.....	260
Eco Mfg. Co.....	237
Eisemann Magneto Corporation....	183
Electric Storage Battery Co.....	212
Excelsior Tool & Machine Co.....	260

F

Fafnir Bearing Co.....	247
Fahrig Metal Co.....	257
Federal Bearings Co., Inc.....	140
Federal Motor Car Co.....	243
Fisk Rubber Co.....	245
Fitzgerald Mfg. Co.....	258
Flint Motor Axle Co.....	218
Foley Traction Rim Co.....	247
Ford Chain Block Co.....	253
Fruehauf Trailer Co.....	271
Fuller & Sons Mfg. Co.....	196

G

G. & O. Manufacturing Co.....	11
Garford.....	109
Gary Motor Truck Co.....	194
General Asbestos & Rubber Co.....	223
General Tire & Rubber Co.....	239
Giant Grip Mfg. Co.....	166
Gilliam Mfg. Co.....	197
Gill Manufacturing Co.....	172, 173
Globe Manufacturing Co.....	256
Graham Brothers.....	154
Grant Motor Car Corporation.....	250
Gurney Ball Bearing Co.....	219

H

Hauck Mfg. Co.....	218
Heil Co.....	121
Hide, Leather & Belting Co.....	210
Highland Body Mfg. Co.....	207
Highway Trailer Co.....	200
Hogan, John R.....	235
Horizontal Hydraulic Hoist Co.....	240
Hyatt Roller Bearing Co.....	144
Hydraulic Hoist Mfg. Co.....	234
Hydraulic Pressed Steel Co.....	143

I

Independent Motor Truck Co., Inc..	226
International Harvester Co. of America, Incorporated.....	163
International Motor Co.....	159
Iron City Spring Co.....	243
Irving Iron Works Co.....	225

J

Janney, Steinmetz & Co.....	251
Johns-Manville, Inc.....	138, 139
Jorgensen Mfg. Co.....	237

New 1921 Rainier Models

BIGGER and more powerful than all previous models are these new Rainier Trucks. In New York City, where they were first introduced, results have been unusually gratifying. Truck buyers have acclaimed them unreservedly the best values on the market. All the changes which were made in the Rainier line have been in the direction of increased power, greater carrying capacity, and greater all around value to the buyer. On the other hand there has been no increase in prices to offset the additional advantages.

Compare These Specifications With Any Other Truck of Equal Rating

¾ TON RAINIER remains substantially the same, except that as standard equipment it has 35 x 5 cord tires all around. This is one of the very few worm-driven trucks on the market in the ¾ ton size. Construction includes Continental motor, Brown-Lipe clutch and transmission, Timken rear axle. Wheelbase, 125 inches.

1 TON RAINIER. Continental motor, Brown-Lipe clutch and transmission. Wheelbase, 133 inches. Tires, 34x4 rear, 34x3 front, solid. Frame, 5 inches deep. Loading space, 114 inches behind driver's seat. Heavier steering gear. New style pedals and control. Larger radiator.

1½ TON RAINIER. Continental motor, 3¼ x 5. Brown-Lipe clutch and transmission, model 30. Wheelbase, 147 inches. Tires, 34 x 5 rear, 34 x 3½ front. Frame, 6 inches deep. Loading space, 126 inches behind driver's seat. Ross steering gear. Heavier propeller shaft with three universal joints. Other improvements.

2 TON RAINIER, based on former model except that Continental motor is increased in size to 4½ x 5¼. Brown-Lipe (model 35) transmission. Sheldon rear axle. Spicer joints. Magneto ignition. Wheelbase, 153 inches.

2½ TON RAINIER. Continental motor, 4½ x 5¼. Brown-Lipe transmission, 4 speeds, located amidships. Ross steering gear. This chassis made in two sizes, 156 and 170 inch Wheelbase. Tires, 34 x 7 rear, 34 x 5 front. Timken axle. Spicer joints.

3½ TON RAINIER. Continental motor, 4½ x 5½. Brown-Lipe clutch and transmission (model 60), located amidships, four speeds forward. Timken axle. Frame, 8 inches. Ross steering gear. Spicer joints. Tires, 36 x 5 dual rear, 36 x 5 single front. This 3½ ton model is one of the sturdiest and most satisfactory trucks on the market.

Rainier prices will stand the same favorable comparison as Rainier specifications. Furthermore, Rainier discounts are large enough to enable the dealer to earn a lot of money during 1921.

If you are progressive—if you are preparing for a prosperous 1921, sign up to sell Rainier Trucks. Correspondence invited with responsible dealers.

See the Rainier Exhibit at the New York Truck Show, January 3-8, 1921

RAINIER MOTOR CORPORATION

Salesrooms, 225-227 West 58th St., New York City

Factory — Flushing, Long Island, N. Y.

Rainier

TRADE-MARK REGISTERED

WORM DRIVE TRUCKS

Advertisers' Index—Continued

K

Kalamazoo Motors Corporation.....	242
Kellogg Manufacturing Co.....	6
Keystone Motor Truck Corporation..	198
King Trailer Co.....	248
Kissel Motor Car Co.....	247

L

Laminated Shim Co.....	252
Larrabee-Deyo Motor Truck Co...	228
Lavine Gear Co.....	10
Le Roi Co.....	265
Long Manufacturing Co.....	189
Luverne Motor Truck Co.....	236, 241
Lycoming Motors Corporation.....	186

M

Mansfield Steel Corporation.....	260
Maremont Mfg. Co.....	256
Martin-Parry Corporation.....	188
Master Trucks, Inc.....	175
Mather Spring Co.....	126
Mead-Morrison Manufacturing Co..	155
Merchant & Evans Co.....	220
Metropolitan Body Co.....	248
Michigan Lubricator Co.....	242
Midwest Engine Co.....	177
Minneapolis Steel & Machinery Co..	131
Modern Electric & Machine Co.....	253
Moline Plow Co.....	263
Monarch Governor Co.....	179
Monson, Charles S.....	240
Mossberg, Frank, Co.....	230
Motors Metal Mfg. Co.....	224
Motor Wheel Corporation.....	141
Multibestos Co.....	176
Muncie Wheel Co.....	255
Muskegon Motor Specialties Co....	246

N

Napoleon Motors Co.....	253
Nash Motors Co.....	145
National Steel Products Co.....	236
Nelson Motor Truck Co.....	111
New Process Gear Corporation.....	114
Niehoff, Paul G., & Co., Inc.....	257
Noble Motor Truck Corporation....	221
Norma Co. of America.....	5

O

Oakley Chemical Co.....	227
Ohio Motor Vehicle Co.....	243
Ohio Steel Foundry Co.....	233
Oshkosh Motor Truck Mfg. Co.....	239

P

Pantasote Co.....	208
Parish & Bingham Corporation.....	124
Park Drop Forge Co.....	239
Parker Motor Truck Co.....	234
Perfection Heater & Manufacturing Co.....	171
Perfection Spring Co.....	134
Pierce-Arrow Motor Car Co.....	211
Pierce Governor Co.....	244
Piston Ring Co.....	133
Polack Tyre & Rubber Co.....	119
Powell Muffler Co.....	261
Pressure Proof Piston Ring Co.....	248

R

Rainier Motor Corporation.....	269
Randall Steel Dumping Bodies Co...	258
Republic Truck Sales Corporation	Front Cover

Ross Gear & Tool Co.....	97
Rowe Calk & Chain Co.....	222
Rowe Motor Mfg. Co.....	190
Russel Motor Axle Co. Inside Back Cover	

S

S K F Industries, Inc.....	107
Sanford Motor Truck Co.....	259
Schacht, G. A., Motor Truck Co....	239
Schultz, R. A., Mfg. Co.....	271
Schwarz Wheel Co.....	162
Selden Truck Corporation.....	8
Selflock Nut & Bolt Co.....	132
Sewell Cushion Wheel Co.....	103
Sharon Pressed Steel Co.....	202
Sheet Steel Products Co.....	246
Sheldon Axle & Spring Co.....	191
Signal Motor Truck Co.....	192
Simplex Manufacturing Co.....	235
Sinclair Refining Co.....	241
Smith, A. O., Corporation.....	222
Snead & Co.....	255
Spicer Manufacturing Corporation..	164
Splitdorf Electrical Co.....	127
Spring Perch Co.....	129
Standard Motor Truck Co.....	113
Standard Steel Works.....	244
Staybestos Mfg. Co.....	237
Stewart Iron Works, Inc.....	242
Stewart Motor Corporation.. Back Cover	
Stoughton Wagon Co.....	271
Stromberg Motor Devices Co.....	181
Sullivan Motor Truck Corporation..	245
Sundstrom Manufacturing Co.....	243
Swedish Crucible Steel Co.....	262

T

Teagle Co.....	225
Thermoid Rubber Co.....	153, 201
Thomart Motor Co...115, 116, 117, 118	
Tiffin Wagon Co.....	220
Timken-Detroit Axle Co.....	195
Timken Roller Bearing Co.....	205
Titan Truck Co.....	249
Titeflex Metal Hose Corporation...	252
Tokheim Oil Tank & Pump Co....	214
Torbensen Axle Co.....	209
Tower Motor Truck Co.....	244
Traffic Motor Truck Corporation	151, 152
Trailmobile Co.....	158
Transportation Equipment Co., Inc..	251
Transport Truck Co.....	178
Turner & Moore Mfg. Co.....	249

U

U. S. Ball Bearing Mfg. Co.....	147
Union Motor Truck Co.....	248
Union Switch & Signal Co.....	228
United States Motor Truck Co., Inc.	238
United States Rubber Co.....	101
Universal Machine Co.....	246

V

Veeder Mfg. Co.....	229
Velie Motors Corporation.....	251
Vulcan Motor Axle Corporation....	259

W

Walker Axle Co.....	252
Walker Mfg. Co.....	213
Walter Motor Truck Co.....	169, 170
Ward LaFrance Truck Corp.....	240
Ward Motor Vehicle Co.....	142
Warner Gear Co.....	168
Warner Mfg. Co.....	232
Waukesha Motor Co.....	255
Weeks-Hoffman Co.....	236
Weidely Motors Co.....	272
Western Drop Forge Co.....	199
Westinghouse Electric & Manufacturing Co.....	219
Williams, J. H., & Co.....	226
Wilson, J. C., Co.....	256
Winther Motor Truck Co.....	255
Wisconsin Motor Mfg. Co.....	241
Wohlrab Gear Co.....	221
Wood Hydraulic Hoist & Body Co..	241
Wyman-Gordon Co.....	253

Z

Zenith Carburetor Co.....	229
---------------------------	-----

The Trailer Business Is GOOD

The very conditions that have cut down the sales of trucks have increased the interest in trailers.

Every big business house is trying to reduce haulage costs. Executives listen when you tell them that neighboring concerns have cut haulage costs 50% and more with Fruehauf Semi-Trailers.

Here is a Real Opportunity for Live Salesmen

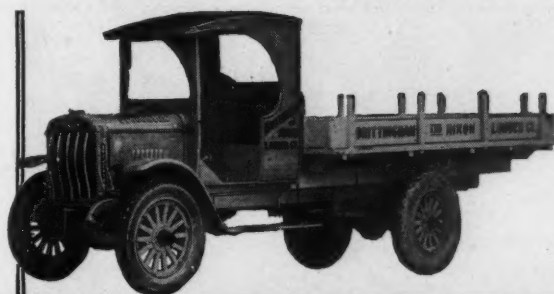
No heavy investment for show room, stock and parts. You can establish a profitable business in Fruehauf Trailers with a small investment and in a short time be making more money than in any similar line.

There are real money-making territories open now for dealers and salesmen who want immediate business action.

Write for Particulars

Fruehauf Trailer Company

10921 Harper Avenue Detroit, Michigan



STOUGHTON

Extra Wear in Every Part

Lower upkeep—longer life—greater service in this new Stoughton Oversize Truck. Built by an organization mature in manufacturing experience it sets a new standard in truck construction. The name Stoughton has been famous for 65 years—the new Stoughton Truck is giving the name even greater significance.

Stoughton Oversize Trucks are well balanced, dependable, low in operating costs. Three models—1½, 2 and 3 ton—designed for extraordinary service at a reasonable price.

If your territory is open it will pay you to put this truck on your sales floor. Write or wire for specifications and details.

The Stoughton Wagon Co.

Stoughton, Wisconsin

Oversize 
TRUCKS

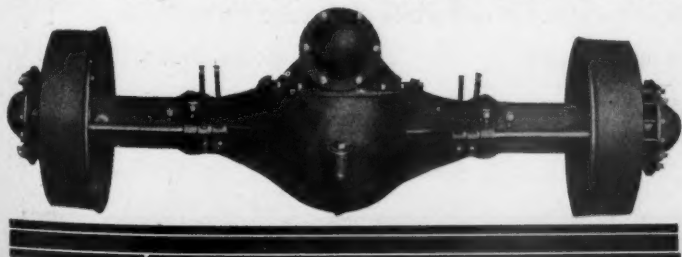


The quality truck maker will be deeply interested in the load-carrying strength and power-transmission capacity of these scientifically designed axles. They represent the most advanced thought in rear axle construction.

For Further Information Write

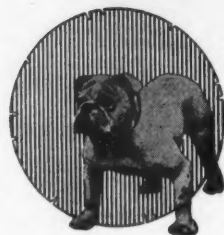
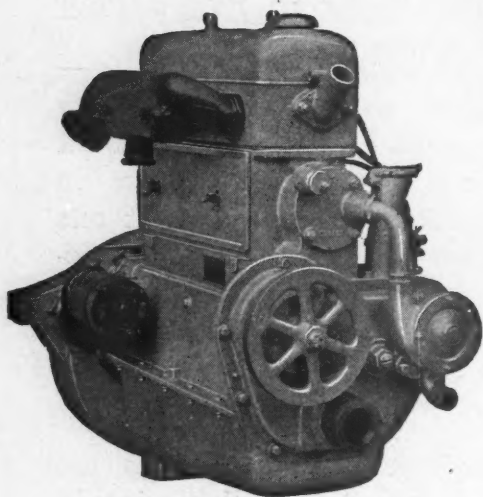
R. A. SCHULTZ MFG. CO.
1809 Belmont Ave. Chicago, Ill.

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Weidely Bulldog

4-Cylinder Valve-in-Head Motors



Weidely Motor Features

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Materials used especially suitable for each part

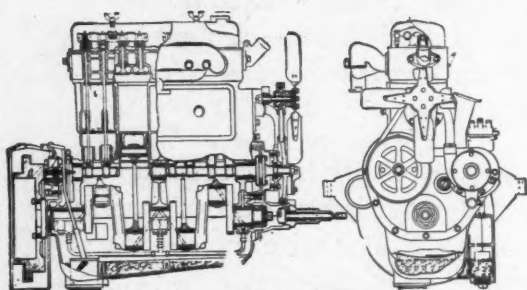
Husky crankshaft

Ample bearings

More horse power per cubic inch

In other words—a Bulldog

Nearly 30,000 in service



MODEL M A T
(Also Other Models)

Specifications

Bore, 4 in.— $3\frac{3}{4}$ in.
Stroke, $5\frac{1}{2}$ in.
Piston Displacement, 276 cu. in.—243
Crankshaft Main Bearing (Rear), $2\frac{1}{2}$ x 4 in.
Crankshaft Main Bearing (Front and Center), $2\frac{1}{4}$ x $2\frac{1}{2}$ in.
Connecting Rod, 2 x $2\frac{1}{4}$ in.
Wrist Pin Bearing, 1 in.
Diameter of Valves in Clear, 1 $\frac{13}{16}$ in.
Total Weight of Motor, 693 lbs.
Horse Power (S. A. E. Rating), 25.6.—22.5
Suspension, 3 point.
Bell Housing, No. 3 S. A. E.
Spread of Arms, $24\frac{1}{2}$ in.
Electrical Equipment, Generator with Distributor or Magneto and Starting Motor.
Oil Pan, Cast Iron or Aluminum.
Bell Housing, Cast Iron or Aluminum.

Motors for
Trucks Tractors Passenger Cars

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THE man whose truck works smoothly, economically, and without interruption takes pride in its important units. He points out the Russel Axle not only because it embodies the power-saving internal gear principle, but on account of its unflinching performance under every conceivable road and load condition.

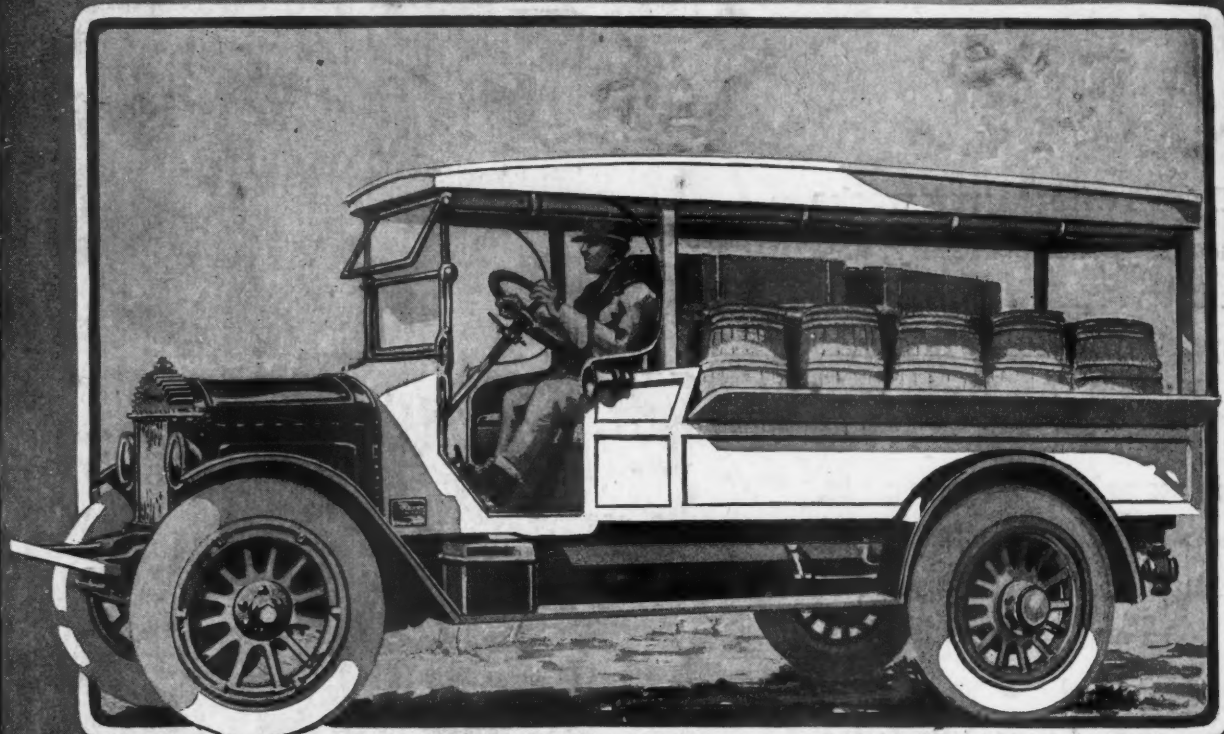
RUSSEL MOTOR AXLE COMPANY
DIVISION McCORD MFG. CO., INC.
DETROIT MICHIGAN



Russel Internal Gear Drive Axles

"Master of Road and Load"

"Stewart Trucks have won-By costing less to run"



THE TRUCK SENSATION OF 1920

THE Stewart One-Ton Speed Truck has made good - 100% good. Now owners know that what we said last January is so. It has quickly won its way to the front—the Stewart leader, and a profit-maker for owners. Business men and farmers favor it; buy it, work it hard, and praise it for its performance.

For this Stewart One-Ton Speed Truck is fast, sturdy and flexible; built light for speed and built strong for hard hauling; its first cost is low, and it keeps right on saving on tires, repairs, gasoline and oil. It is furnished with electric starter, electric lights, magneto ignition and five-inch cord tires. All the famous "less-cost-to-run" Stewart features are included—simple design, hundreds of needless parts eliminated, oilless bushings, heavy truck axles, cast tank radiator, front bumper, rebound spring plates, internal gear drive axle—all features that have helped to win the Stewart world-wide reputation for quality and economy. We still have some valuable territory open. Write for our dealership proposition.

STEWART MOTOR CORPORATION, BUFFALO, N.Y.

Made Also in the Following Capacities: $\frac{3}{4}$, $1\frac{1}{2}$, 2, $2\frac{1}{2}$ and $3\frac{1}{2}$ Ton

Stewart

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